Expert Commentary Series

Wrong About Measles, Cancer & Autism: A Review of Dan Olmsted's Article "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" (*Age of Autism*, May 17, 2014)

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Executive Summary

A number of organizations as well as bloggers have arisen over the past several decades claiming that vaccines and/or their ingredients cause a number of disorders, foremost among these is autism. The results of their efforts have been a decline in vaccine coverage and a rise in previously rare childhood diseases, resulting in unnecessary suffering, hospitalizations, long-term disabilities, and even death. The following paper will demonstrate, using as an example an article by Dan Olmsted, founder, owner, and chief editor of *Age of Autism*, the poor scholarship and science displayed by many antivaccinationists. If people are to decide on whether to vaccinate their children or not, it should be based on scholarly, well-grounded science, and reflect basic common sense, not claims made by people who are deficient in these.

Olmsted's recent post on *Age of Autism,* "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" should raise a number of red flags regarding his scholarship, basic understanding of science, and even common sense. Olmsted's article claims that a recent study treated multiple myeloma with a measles vaccine. Olmsted then goes on to speculate that measles may have had a preventative effect on cancer and that vaccinations led to increasing rates of cancer.

The conclusions of this paper are:

1. Dan Olmsted, founder, owner, and chief executive of *Age of Autism,* posted an article, "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" claiming a recent study, Russell SJ *et al.* (July 2014) "Remission of Disseminated Cancer After Systemic Oncolytic Virotherapy" used a measles vaccine to treat multiple myeloma. Olmsted then goes on to speculate that "wild-type measles . . . performs some unsuspected function in preventing the occurrence of cancer." Olmsted based his entire article on two newspaper accounts of the research with no indication he either read the easily available actual research article and/or understood it. A measles vaccine was not used. Instead it was a genetically engineered measles virus strain that was designed to specifically target cancer cells. In fact, if Olmsted had even read the two newspaper articles carefully, they both mentioned that the measles virus had been so modified.
2. Though wrong about the use of a measles vaccine, this paper looks at the remainder of Olmsted's paper to show that even if he had been right about the use of a vaccine, he was still wrong about

the inferences from it, thus showing his poor scholarship, poor understanding of science, and overall poor knowledge of the history and current status of vaccine-preventable infectious diseases.

3. Olmsted traced "the anonymous Case 3 in the first medical paper on autism, from 1943" [Kanner, "Autistic Disturbances of Affective Contact"][and found] "his death certificate from July 8, 2011, the cause was listed: multiple myeloma." Olmsted then writes: "According to Wikipedia, this kind of cancer is increasing, and affecting younger people." Case 3 was born November 17, 1937, so he was 73½ at the time of his death, certainly not young and well within historical statistics for cancer deaths. Though Wikipedia science articles are well-referenced, this one specifically stated: "Citation needed." This gives just one example of Olmsted's illogic and cherry-picking articles that confirm his pre-existing beliefs, ignoring the "Citation needed."
4. While Olmsted claims measles is a benign childhood disease, both historical and current statistics tell a quite different story. "In the United States in the prevaccine era, approximately 500,000 cases of measles were reported each year, but, in reality, an entire birth cohort of approximately 4 million persons was infected annually. Associated with these cases were an estimated 500 deaths, 150,000 cases with respiratory complications, 100,000 cases of otitis media, 48,000 hospitalizations, 7,000 seizure episodes, and 4,000 cases of encephalitis, which left up to one quarter of patients permanently brain damaged or deaf." (Strebel, 2013, p. 358) Prior to the development of antibiotics, opportunistic bacterial pneumonias killed many more. Measles is just as infectious today, just a plane flight away. Given a much larger population and the increasing risk of deaths from secondary bacterial pneumonias due to increasing rates of antibiotic-resistant microbes, without vaccination the above numbers could be significantly higher.
5. Cancer results from a succession of mutations in normal cells. These mutations occur during cell divisions. Every time a cell divides, approximately six random mutations occur. Most are harmless; but over time, one may not be and then another until cancer develops. Most mutations are random; but environmental factors such as chemicals and microbes can sometimes cause mutations. The more times, the faster the rate of cell divisions, the more chance of mutations. Measles is a system-wide disease that damages and kills cells throughout our bodies. Though initially suppressing our immune systems, the immune response involves an exponential production of immune cells to combat the infection. In other words, the exact opposite of Olmsted's speculation would occur, that is, the risk of mutations would, if anything, accelerate from "wild-type measles." Measles vaccines are attenuated (extremely weakened) to elicit a local short-lived infection, just enough to allow the immune system to recognize it and create memory cells ready to defend against any future exposure.
6. There is a history of microbes and vaccines used to treat cancer and other diseases such as syphilis. For instance, malaria was used to treat syphilis and a tuberculosis vaccine is still used to treat bladder cancer. No one today in their right mind has ever promoted mass infection with malaria to prevent syphilis or mass infection with tuberculosis to prevent bladder cancer.
7. Olmsted writes regarding Case 3 from the first medical article that diagnosed autism: "Leo Kanner, the author of that first autism paper, noted that "following smallpox vaccination at 12 months, he had an attack of diarrhea and fever, from which he recovered in somewhat less than a week." (We can assume he had measles.)" Kanner described the mother as a college graduate whose father was a physician, that she took copious notes which "indicated obsessive preoccupation with details. . . She watched (and recorded) every gesture and every "look." Measles was ubiquitous at the time with a distinct rash that was well-known to those who were raised during this time period. One could, therefore, question why an educated women, with a

propensity towards taking copious notes, would fail to recognize and subsequently document her son's case as suspected measles or, at the very least, document the presence of a measles-like rash along with the fever and diarrhea? It is more likely that the fever and diarrhea either resulted from the smallpox vaccine or from coincident infection by any number of commonly circulating viruses, or even from mild food poisoning. Olmsted's "we can assume he had measles" is nonsensical.

8. Olmsted claims Kanner missed a big clue as Case 3's mother noted his failure to talk: "I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward mentally gradually for the last two years." Olmsted assumes this resulted from the smallpox vaccination. However, the mother also, in comparing her two children, explained how Case 3 had shown NO anticipatory response to being picked up as Kanner writes in his discussion: "the children's aloneness from the beginning of life . . . We must, then, assume that these children have come into the world with innate inability to form the usual, biologically provided affective contact with people." So Olmsted missed that Case 3 showed clear signs of autism almost from birth and, though the mother was uncertain when "he stopped the imitation of word sounds," Olmsted decides it must have stemmed from the smallpox vaccination. It appears that it is Olmsted that missed big clues.
9. Olmsted writes: "In short, the first commercial uses of ethyl mercury triggered the first cases of autism; the explosion in vaccines containing it triggered the autism explosion beginning around 1990." Olmsted ignores the fact that Kanner, in the first article describing autism discusses how most of his cases had been previously diagnosed as either retarded or suffering from childhood schizophrenia and had shown signs of "extreme aloneness" from birth. There is a long history of the classification of medical conditions changing with new data and medical knowledge, though the conditions were not new, something Olmsted seems to be unaware of. There is good evidence that autism is not a new condition.
10. Based mainly on one recent article by Classen, "Review of Vaccine Induced Immune Overload and the Resulting Epidemics of Type 1 Diabetes and Metabolic Syndrome, Emphasis on Explaining the Recent Accelerations in the Risk of Prediabetes and other Immune Medicated Diseases" (February 2014), Olmsted discusses how vaccines overload a young child's immune system. Nowhere does he or Classen discuss what is known about the number of antigens our immune system can deal with at any one time in relation to the number a child is exposed to daily from the environment compared to the minute number even when five vaccines are given at once. Classen's article is not a systematic review; but a cherry-picked biased presentation. In addition, he fails to deal with all credible alternative hypotheses and he may have misrepresented one article's findings.
11. Olmsted claims to be a citizen scientist; but his writing gives NO indication he has attempted to learn the basics of epidemiology, biostatistics, microbiology, immunology and other relevant subjects, nor that he has attempted to learn the history and current status of vaccine-preventable diseases. In fact, he writes in another post: "I am not a chi square guy. I'm an English major. I am in no position to evaluate the techniques used to calibrate the autism rate in black males, or anybody else, before or after the MMR shot." In addition, given his profession as journalist, his use of newspaper articles without indication he read the actual research article and his use of Classen's article because it confirmed his pre-existing beliefs fails the minimal requirements of fact-checking/verification expected of any journalist.
12. Olmsted writes: "It seems almost too simple, but then, as Mark Blaxill says, epidemics are simple by their very nature, once the cause is identified and the truth is told." The rate of knowledge is

doubling at ever decreasing time intervals. The world has become very complex. It may be psychologically advantageous in the short run to retreat into a more simplistic world; but Olmsted and *Age of Autism's* use of "belief" falls into one of the caveats for doing science as Neil deGrass Tyson explains in the recent TV series *Cosmos*: "Believing something doesn't make it so." Though we do sometimes find causes of epidemics that lead to interventions, either preventative or for developing treatments, these causes are often situation-specific within a chain of and matrix of events and are often tentative. The science needed to make such determinations is far from simple.

Conclusion

As stated on its website, *Age of Autism*: "We are published to give voice to those who ***believe*** [my emphasis] autism is an environmentally induced illness, that it is treatable, and that children can recover." Dan Olmsted is the founder, owner, and chief editor of *Age of Autism.* My review of his article makes clear that, despite his "belief" that he is a citizen scientist, from his writings he gives NO indication of having learned even the basics of the methods and knowledge base of any of the disciplines necessary to even attempt to evaluate vaccines. In fact, he doesn't even seem to follow the minimal guidelines of good journalism, that is fact-checking/verification; but, chooses to use information that confirms his pre-conceived belief system.

Age of Autism is one of the antivaccination websites whose articles contribute to ever-decreasing rates of vaccinations as parents opt not to vaccinate their children due to its influence. Previous infectious diseases such as whooping cough and measles are on the rise with unnecessary suffering and worse. Assuming as owner and chief editor Olmsted decides or, at least, has a major input in determining which articles will be posted on *Age of Autism*, his beliefs, his apparent lack of the skills necessary to determine scientific and logical credibility of the information he uses as clearly shown by this paper, should give one pause as to the credibility of anything posted at *Age of Autism.* In fact, reviews I wrote on previous *Age of Autism* posted papers by Teresa Conrick and Cathy Jameson, both contributing editors to *Age of Autism,* discussed additional examples of poor science, poor scholarship, and a lack of common sense (Harrison, 2015ab).

If parents are to decide on whether or not to vaccinate their children, it should be based on solid science and solid scholarship, not articles based on belief systems displaying cherry picking/confirmation biases lacking any indication of even minimal levels of understanding of scientific methodology, basic scientific knowledge, logic, and common sense. Olmsted was wrong about the use of a measles vaccine in treating multiple myeloma; but had he been right, he would have been wrong about the implications he drew. Literally, Olmsted doesn't know what he is talking about!

Introduction

A number of organizations as well as bloggers have arisen over the past several decades claiming that vaccines and/or their ingredients cause a number of disorders, foremost among these is autism. The results of their efforts have been a decline in vaccine coverage and a rise in previously preventable and currently rare childhood diseases, resulting in unnecessary suffering, hospitalizations, long term disabilities, and even death. If one is to believe them, the first question that comes to mind is whether their claims display acceptable standards of scholarship, science, and, in some cases, even basic

common sense. In other words, do they know what they are talking about? *Age of Autism* is one of the antivaccinationist websites. The following will show, using an article posted on *Age of Autism's* website as an example, the poor scholarship and science displayed by many antivaccinationists. If parents are to decide on whether or not to vaccinate their children, it should be based on scholarly, well-grounded science, and reflect basic common sense, not claims made by people who are deficient in these. [Note. I prefer to use as many direct accurate quotes from as many sources as possible rather than paraphrasing in my own words. In addition, I have used Wikipedia articles together with additional references. The Wikipedia articles are easily accessible and most have extensive references of their own. However, for the more skeptical readers, they are welcome to check out the other references I have used for which and, when possible, I have included URL/hyperlinks to].

Olmsted's recent post on *Age of Autism,* "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" should raise a number of red flags regarding his scholarship, basic understanding of science, and common sense. Olmsted's article claims that a recent study treated multiple myeloma with a measles vaccine. Olmsted then goes on to speculate that measles may have had a preventative effect on cancer and that by vaccinating children we contributed to cases of cancer.

According to Age of Autism:

> We are published to give voice to those who ***believe*** [my emphasis] autism is an environmentally induced illness, that it is treatable, and that children can recover. For the most part, the major media in the United States aren't interested in that point of view, they won't investigate the causes and possible biomedical treatments of autism independently, and they don't listen to the most important people – the parents, many of whom have witnessed autistic regression and medical illness after vaccinations. We do all those things, and more.
>
> We ***believe*** [my emphasis] that autism is the defining disorder of our age, man-made and therefore preventable, and that it points to the truth about other problems that beset us, from ADD to asthma to Alzheimer's. We address those issues as well, along with exposing the special interests, bureaucratic inertia, and medical malfeasance that perpetuate denial and suffering. (Olmsted, A Letter from the Editor, *Age of Autism*, http://www.ageofautism.com/a-welcome-from-dan-olmste.html)

"Dan Olmsted is an investigative reporter and former senior editor for United Press International (UPI), a news agency of the Unification Church company News World Communications . . . His columns on health and medicine appeared regularly in the Washington Times, also owned by the church, and were syndicated nationally from UPI's Washington D.C. bureau. He currently owns and edits the *Age of Autism* website, which he describes as the 'Daily Web Newspaper of the Autism Epidemic'." (Wikipedia, "Dan Olmsted")

Dan Olmsted's "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" (*Age of Autism,* May 17, 2014)

Olmsted writes:

> A lot of us "citizen scientists" who saw the news this week about a megadose of measles vaccine as a cancer treatment seem to have had the same question at the same time.
>
> "Mayo Clinic researchers announced a landmark study where a massive dose of the measles vaccine, enough to inoculate 10 million people, wiped out a Minnesota woman's incurable blood cancer," USA Today reported. "The Mayo Clinic conducted the clinical trial last year using virotherapy. The method discovered the measles virus wiped out multiple myeloma cancer cells. Researchers engineered the measles virus (MV-NIS) in a single intravenous dose, making it selectively toxic to cancer cells.**"**
>
> Now the question: Does this suggest that wild-type measles infection, the kind hundreds of thousands of kids caught every year before the measles vaccine arrived in the 1960s, performs some unsuspected function in preventing the occurrence of cancer? And the follow-up: Did mass vaccination wipe out this protection?
>
> The first thing that caught my eye was the type of cancer – multiple myeloma. As it happens, I've been hearing about this cancer in the autism community quite a bit in the last year. In fact, in August of last year Mark Blaxill and I reported on the anonymous Case 3 in the first medical paper on autism, from 1943. We identified him as William Ritchey Miller of Raleigh, N.C. On his death certificate from July 8, 2011, the cause was listed: multiple myeloma.
>
> According to Wikipedia, this kind of cancer is increasing. and affecting younger people than it has in the past, resulting in about 74,000 deaths in 2010, up from 49,000 in 1990.
>
> To me, it stands to reason that a virus - like measles - that triggers an immune response in children might serve some broader biological purpose best left undisturbed. Doing so might have some downstream effect on both an autoimmune condition like autism and a cancer of the immune system like multiple myeloma.
>
> It seems almost too simple, but then, as Mark Blaxill says, epidemics are simple by their very nature, once the cause is identified and the truth is told.
>
> That exposure to mercury -- a known and potent dysregulator of immunity -- may have messed up Ritchey's immune system enough to complicate his reaction to viruses, perhaps in concert with a family disposition to autoimmunity. Leo Kanner, the author of that first autism paper, noted that "following smallpox vaccination at 12 months, he had an attack of diarrhea and fever, from which he recovered in somewhat less than a week." (We can assume he had measles.)
>
> While Ritchey recovered physically, Kanner appears to have missed a big clue here. Regarding Ritchey's failure to talk, his mother told Kanner that "I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward

mentally gradually for the last two years." His mother made this comment when Ritchey was about three, which puts his regression at the same time as his reaction to the smallpox shot two years earlier. But Kanner, who called the condition he was the first to describe "inborn autistic disturbances of affective contact," seems to have missed clear evidence that Ritchey regressed after a bad reaction to a live virus vaccination.

[According to Wakefield:] "So measles is innocuous when encountered under normal circumstances of dose and age of exposure. But when it's encountered under atypical circumstances early in life, particularly at high dose, then the outcome is very different.

It is not hard to imagine that an immune system so dysfunctional it "does nothing" could spawn all kinds of mayhem, including cancerous cells. On Thursday I quoted from a new scientific paper "that presents convincing evidence that the rapid increase in the number of vaccines given to US children has now created a state of immune overload in the majority, or close to the majority, of young US children and that this is being manifested by related health issues including epidemics of obesity, diabetes, and autism."

Actual Scientific Article that Newspaper Articles Referred to: Russell *et al.* "Remission of Disseminated Cancer After Systemic Oncolytic Virotherapy." (2014 Jul)

Russell writes:

> MV-NSIS is a recombinant oncolytic measles virus (MV) derived from an attenuated Edmonston lineage vaccine strain (MV-Edm) that was adapted to grow on human cancer (HeLa) cells. . . Measles is an enveloped lymphotropic paramyxovirus with a negative-sense RNA genome whose surface glycoproteins not only mediate the entry of the virus into susceptible target cells but also drive the fusion of infected cells with adjacent uninfected cell. ***Unlike naturally occurring measles***, [my emphasis] MV-Edm, and hence MV-NIS, targets CD46 as a cell-entry and cell-fusion receptor. CD46 is a ubiquitous complement regulatory protein that, fortuitously, is highly expressed on human myeloma cells, making them abnormally susceptible to MV-NIS infection, syncytium formation, and cell killing. (Russell, 2014, p. 926)
>
> One key factor that may have contributed to the successful outcome in these 2 patients was their low pretreatment serum titers of anti-measles antibodies. Another factor of probable relevance was the high dose of virus administered. Dose-response relationships for antitumor efficacy and virus delivery have been well documented in previous virotherapy studies, and a dose-threshold effect can be mathematically predicted. (ibid, p. 932)

Thus, it is clear that a vaccine was NOT used. "A vaccine is a biological preparation that improves immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or killed forms of the microbe, its toxins or

one of its surface proteins. The agent stimulates the body's immune system to recognize the agent as foreign, destroy it, and keep a record of it, so that the immune system can more easily recognize and destroy any of these microorganisms that it later encounters." (Wikipedia, "Vaccine")

Russell *et al.* obtained the measles virus vaccine strain; but then modified it so that it would preferentially target a specific cancer cell line. The virus Russell *et al.* created and used in his study is therefore distinct from the vaccine virus. Rather than a weakened or killed virus to stimulate the immune system, this one was engineered to kill only cancer cells.

The *USA Today* article Olmsted refers to states: "Researchers engineered the measles virus (MV-NIS0) in a single intravenous dose, making it ***selectively toxic*** [my emphasis] to cancer cells." Unfortunately, the article's title is incorrect, "Massive dose of measles vaccine clears woman's cancer" though a quote in the article from Russell also makes it clear, "We have known for some time viruses act like a vaccine. If you inject a virus into a tumor you can provoke the immune system to destroy that cancer and other cancers. This is different, it puts the virus into bloodstream, it infects and destroys the cancer, debunks it, and then the immune system can come and mop up the residue." (USA Today Network, 2014)

The Washington Post article's title is more accurate, "Woman's cancer killed by measles virus in unprecedented trial." The article goes on to state: "Russell said he and his team had engineered the virus to make it more suitable for cancer therapy . . . Oncolytic virotherapy — using re-engineered viruses to fight cancer — has a history dating back to the 1950s." (Bever, 2014)

Most reasonable people are aware that newspaper articles don't always get it right, especially in regards to science and, of course, the devil is in the details. The original article, though officially published in July, was available online May 13 as an "Article in Press" to download free as a pdf. There is NO indication Olmsted read it or, if he did, understood it. And, if Olmsted had bothered to check out the journal, he would also have found an editorial that discussed the history of using viruses as treatment modalities and the specificity of the MV strain, etc. which was also published online on May 13 (Bell, 2014). Even a careful reading of the two newspaper articles should have prompted Olmsted to find and read the actual research article.

The importance of the distinction between a vaccine and an engineered live virus will become apparent below.

Viral Specificity

"The life cycle of viruses differed greatly between species but there are six *basic* states in the life cycle of viruses: ***Attachment*** is a specific binding between viral capsid proteins and specific receptors on the host cellular surface. This specificity determines the host range of a virus. . . this mechanism has evolved to favor those viruses that infect only cells in that they are capable of replication. Attachment to the receptor can induce the viral envelope protein to undergo changes that results in the fusion of viral and cellular membranes, or changes of non-enveloped virus surface proteins that allow the virus to enter." (Wikipedia. "Virus", p. 7; see also, Helenius, 2007, p 100) "Most viruses are able to infect specific types of cells of only one host species." (Tortora, 2013, p.370)

Russell *et al.* (2012) write in an earlier review of oncolytic virotherapy: "Oncolytic viruses are therapeutically useful anticancer viruses that will selectively infect and damage cancerous tissues

without causing harm to normal tissues. Each virus has a specific cellular tropism that determines which tissues are preferentially infected, and hence, what disease is caused." (Russell, 2012, p.658)

If Olmsted had accessed the journal and read the accompanying editorial, he would have read: "One common worry about the use of replication-competent virus vectors as therapeutics for cancer is a fear of 'off-target infections' leading to virus-mediated toxicities. This is a reasonable concern because immunosuppressed cancer patients can succumb to infection with a variety of wild-type pathogenic viruses including MV.14 However, as with all OV platforms, the MV-NIS vector is highly attenuated for growth in normal tissues yet retains the capacity to infect and destroy tumor cells. Russell *et al.* illustrates the exquisite specificity of MV-NIS infection, which in these patients is clearly targeted and restricted to the tumor bed." (Bell, 2014, p.864)

It should be clear that a measles vaccine was not used and that the measles virus had been engineered to specifically target one type of cancer and not other cells.

The only conclusion is that Olmsted's article is based on a false premise, namely, that a vaccine was used to treat multiple myeloma. The false premise arose from his poor scholarship, that is, relying on newspaper articles when the actual scientific journal article was easily available, not even carefully reading the newspaper articles, and his deficient understanding of viral specificity.

I could stop here; but to give further evidence of Olmsted's overall poor scholarship and poor understanding of science, reflecting on *Age of Autism's* credibility, given his role as owner and chief editor, let us assume that he was right about a measles vaccine being used to treat multiple myeloma and look at the rest of his article.

Measles Without Vaccinations

According to Olmsted:

> Now the question: Does this suggest that wild-type measles infection, the kind hundreds of thousands of kids caught every year before the measles vaccine arrived in the 1960s, performs some unsuspected function in preventing the occurrence of cancer? And the follow-up: Did mass vaccination wipe out this protection?
>
> [According to Wakefield:] "So measles is innocuous when encountered under normal circumstances of dose and age of exposure. But when it's encountered under atypical circumstances early in life, particularly at high dose, then the outcome is very different. (Olmsted, May 17, 2014)

According to the CDC (2012, pp.173-174): "Before a vaccine was available, infection with measles virus was nearly universal during childhood . . . Measles is still a common and often fatal disease in developing countries. The World Health Organization estimates there were 164,000 deaths globally from measles in 2008. . . Approximately 30% of reported measles cases have one or more complications. Complication of measles are more common among children younger than 5 years of age and adults 20 years of age and older."

"Measles virus infects multiple organ systems and targets epithelial, reticuloendothelial, and white blood cells, including monocytes, macrophages, and T lymphocytes. . . Complications from measles

have been reported in every organ system. Many of these complications are caused by disruption of epithelial surfaces and immunosuppression." (Perry, 2004, p.S4)

Though the vast majority of cases recover without sequalae, the illness involves a "prodrome [that] lasts 2-4 days (range 1-7 days). It is characterized by fever . . . often peaking as high as 103º-105º. This is followed by the onset of cough, coryza (runny nose), or conjunctivitis. . . The measles rash is a maculopapular eruption that usually last 5-6 days. . . Other symptom of measles include anorexia, diarrhea, especially in infants, and generalized lymphadenopathy. (CDC, 2012, p.174)

"In the United States in the prevaccine era, approximately 500,000 cases of measles were reported each year, but, in reality, an entire birth cohort of approximately 4 million persons was infected annually. Associated with these cases were an estimated 500 deaths, 150,000 cases with respiratory complications, 100,000 cases of otitis media, 48,000 hospitalizations, 7,000 seizure episodes, and 4,000 cases of encephalitis, which left up to one quarter of patients permanently brain damaged or deaf." (Strebel, 2013, p. 358)

"By the late 1950s, even before the introduction of measles vaccine, measles-related deaths and case fatality rates in the United States had decreased markedly, presumably as a result of improvement in health care and nutrition. From 1956 to 1960, an average of 450 measles-related deaths were reported each year (~1 death/1000 reported cases), compared with an average of 5300 measles-related deaths during 1912-1916 (26 deaths/1000 reported cases). Nevertheless, in the late 1950s, serious complications due to measles remained frequent and costly. As a result of measles virus infections, an average of 150,000 patients had respiratory complications and 4000 patients had encephalitis each year; the latter was associated with a high risk of neurological sequelae and death. These complication and other resulted in an estimated 48,000 persons with measles being hospitalized every year." (Orenstein, 2004, s1)

One can compare the annual death rates from measles prior to vaccinations and subsequent to them in the Appendix to the CDC Pink Book "Reported Cases and Deaths from Vaccine Preventable Diseases, United States, 1950-2011" Available at: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/G/cases-deaths.pdf . The Appendix also lists a >99% decrease in Measles in "Impact of Vaccines in the 20th & 21st Centuries" Available at: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/G/impact-of-vaccines.pdf

"During World War I, 96,817 cases of measles were reported among U.S. Army personnel, with 2,367 deaths (case-fatality rate, 2.4%). In fact, measles was the fourth leading cause (after influenza and pneumonia, combat injuries, and noncombat injuries) of death of U.S. Army personnel during the First World War. In the civilian population, in the period 1917-1919, >1 million cases were reported, with more than 21,000 deaths (case-fatality rate, 1.9%)." (Hinman, 1983, p. 439)

With the advent of antibiotics, measles fatalities decreased significantly as the following from a 1949 medical journal article explains:

"In the past decade the course and prognosis of many of the bacterial diseases has been greatly altered by the application of efficient antibiotic substances. Although no specific agents are available for the treatment of most of the viral infections, the natural history of many of them has been greatly changed because of the effectiveness of chemotherapy in combatting the secondary bacterial complications

which often produced a fatal outcome. . . bronchopneumonia occurring in the course of rubeola [measles]. . . Although uncomplicated rubeola [measles] may produce severe illnesses, it is not dangerous to life unless one of three complications develop; suppurative otitis media, encephalitis, or bronchopneumonia." (Weinstein, 1949, p.314)

"Measles is estimated to account for 6-21% of all cases of pneumonia in children and for 8-93% of deaths from pneumonia. . . . During measles outbreaks, pneumonia rates may rise dramatically. . . Additional evidence for the important role of bacterial superinfection comes from post-mortem studies on measles which report this problem in 25-50% of fatal cases . . . Limited studies suggest that viruses are also a significant cause of measles-associated pneumonia." (Hussey, 1996, p.308)

In another article, Table 3 Estimated Cases and Deaths Prevented and Costs Saved for Selected Vaccine-Preventable Diseases With a Vaccination Program for 1 Cohort (2009 Birth Cohort estimated for Measles: Cases Prevented 3,835,825; Deaths Prevented 3,106; Direct Costs Saved $3,762,000,000; and Societal Costs Saved (Direct + Indirect) $8,862,000,000. "Decision analysis was conducted using population-based vaccination coverage, published vaccine efficacies, historical data on disease incidence before vaccination, and disease incidence reported during 2005 to 2009. . . A hypothetical 2009 US birth cohort of 4 261 494 infants over their lifetime was followed up from birth through death. (Zhou, 2014, p.1) "Direct medical costs include those associated with treating an initial infection as well as costs associated with complications and sequelae of diseases. Direct non-medical costs include travel costs, costs for special education of children disabled by diseases, and costs for other supplies for special needs. Indirect costs include the productivity losses owing to premature mortality and permanent disability among cohort members, as well as opportunity costs associated with parents who miss work to care for their sick children or cohort members themselves who miss work owing to vaccine-preventable illness." (ibid, p.2)

As a recent outbreak in San Diego demonstrated, we are only a plane flight away from infection and our main line of defense is vaccination. "The index patient was an unvaccinated boy aged 7 years who had visited Switzerland with his family, returning to the United States on January 13, 2008. . . He was taken to the . . . hospital's emergency department because of higher fever 104ºF and generalized rash. . . a total of 11 additional cases in unvaccinated infants and children . . . were identified." (CDC, February 22, 2008) There have been a number of additional outbreaks in the U.S., including one among the Amish with more than 360 cases (USA Today, July 2, 2014). Most of the cases were acquired outside of the United States and afflicted individuals who had not been vaccinated." (Wikipedia, "Measles Outbreaks in the 21st Century")

As of January 1, 1920, the U.S. Population was 106,021,537 (Wikipedia, "United States Census"). The combined civilian and military deaths from measles was close to 25,000 just a couple of years earlier. With the advent of antibiotics for treating opportunistic bacterial pneumonias and other secondary infections, the death rates plummeted to between 400 and 500 per year. In the 1950s the majority of women were housewives; but nowadays in the struggle to make ends meet, both parents are working. Though the vast majority of measles cases will recover without sequalae, measles results in a week or more of suffering on the part of the child and often loss of work/income for one of the parents. Add in the hospitalizations and the 1,000 or more children with permanent disabilities, including deafness and mental retardation, and I find Wakefield's claim, quoted by Olmsted, that "measles is innocuous when encountered under normal circumstances of dose and age of exposure," incredible. Besides quoting Wakefield, there is NO indication in Olmsted's article of awareness of just how serious measles is.

The U.S. Population as of January 1, 1950 was 150,697,361 with the decade ending in a population of 179,323,175. (ibid) As of April 1, 2010, the U.S. Population reached 306,745,538 (ibid). Given that, besides antibiotics to treat secondary bacterial infections, there is still no accepted treatment for measles and that, as mentioned above, it is but a plane ride away, one can easily envisage, if vaccinations ended, a return to universal exposures and almost universal infections with higher numbers of deaths and disabilities. Given also the problems with antibiotic resistance that have developed, mortality rates from measles associated secondary bacterial infections could increase significantly. (Levy, 1992; O'Neill, 2014; Schnayerson, 2002)

For a fascinating history of measles, describing just how deadly it was in the past and continues to be, see Cliff (1993). For more on measles, see: Wikipedia "Measles"; Cliff (1992); and Griffin (2007).

However, Olmsted's focus is on his ***belief*** that a measles vaccination was used to treat multiple myeloma and that "wild-type measles infection, the kind hundreds of thousands of kids caught every year before the measles vaccine arrived in the 1960s, performs some unsuspected function in preventing the occurrence of cancer?" So, what do we know about cancer?

Cancer as Genetic Mutations

Mutations Inherent in Normal Cell Division:

> Cancer is fundamentally a disease of tissue growth regulation failure. In order for a normal cell to transform into a cancer cell, the genes which regulate cell growth and differentiation must be altered.
>
> Replication of the enormous amount of data contained within the DNA of living cells will probabilistically result in some errors (mutations).
>
> The transformation of normal cell into cancer is akin to a chain reaction caused by initial errors, which compound into more severe errors, each progressively allowing the cell to escape the controls that limit normal tissue growth. This rebellion-like scenario becomes an undesirable survival of the fittest, where the driving forces of evolution work against the body's design and enforcement of order. Once cancer has begun to develop, this ongoing process, termed clonal evolution, drives progression towards more invasive stages. (Wikipedia "Cancer", pp 5-6)
>
> But what causes these mutations? . . . Each time one of these proliferating cells gets ready to divide into two cells, its genetic information (in the form of DNA) must be copied, so that the complete genetic cookbook can be passed down to its daughter cells. And each time this copying process takes place, mistakes are made. In fact, on average, about sixty of the DNA letters in the cookbook are changed each time it is copied. This may seem like a lot, but when you realize that the whole cookbook contains about six billion letters, it is clear that the gene-copying process is amazingly faithful. . . Of course, if the process of copying out chromosomes were completely error-free, humans never could have evolved, since mutations are required for evolution. Indeed, it's likely that Mother Nature adjusted the error rate to be high enough to allow for fairly rapid

> evolution, yet not so high that we would all look like characters out of *Star Wars*. . . So the proliferation that takes place during the growth of a human offers the opportunity for copying errors to occur, but of course, all cell proliferation doesn't stop at adulthood. (Sompayrac, 2004, p. 6)

DNA polymerase makes approximately one uncorrected mistake for every billion pairs of DNA that it copies. Mutations that "just happen" because of the way the enzyme functions are called *spontaneous mutations. "*DNA polymerase's *mutation rate* of one error for every billion base pairs copied does sound pretty good . . . There's just one problem — cells can have a lot of DNA. You, for example, have about 3 billion base pairs of DNA in every one of your cells. That means that every time one of your cells divides, and DNA polymerase copies the DNA, the resulting cells will have about six mutations. Multiply this by the trillions of replicating cells in your body and it is easy to see the significance of this seemingly low error rate. (Kratz, 2009, p.282; see also, Lewis, 2005, Chapter 12, Gene Mutations, pp. 215-238 and Chapter 18, The Genetics of Cancer, pp. 353-371; Tortora, 2013, p.228)

Extremely Rare Mutations Result In Cancer:

According to Weinberg:

> The creation of a tumor is an extraordinarily slow process, often extending over decades. (Weinberg, 1998, p.2)
>
> Until the nineteenth century, cancer was relatively rare, an observation largely explained by the fact that cancer is a disease of older people. In many European countries at the beginning of the nineteenth century, expected life span was only about thirty-five years. Many people who might have contracted cancer late in life were struck down far earlier by infectious disease, malnutrition, or accident. (ibid, p.13)
>
> Sharply rising [with age] curves . . . describe processes of great complexity. They indicate that a multitude of events, happening in succession one after another, must occur before a result is achieved, in this case a tumor. The appearance of most cancers seemed to require four to six such events. Each event was itself an occurrence of low probability that seemed to require many years to take place. Only when all of these steps were completed would the process culminate in a clinically detectable malignancy. (ibid, p.47)
>
> As the human body aged, the chances would increase rapidly that all of the necessary events—random accidents—would converge on a cell somewhere in the body. (ibid, p.48)
>
> The number of these mutations required to make a tumor seemed to be quite large—half a dozen and maybe even more. Following each critical mutation, the descendants of the recently mutated cell would need to multiply into a flock of a million or more before the next one-in-a-million mutation became likely in one of its descendants. (ibid, p.56)

> During a lifetime of seventy and more years, a human body will produce about 10 million billion cells. On 10 million billion separate occasions, cells will go through their cycles of growth and division. . . While ten humans leading virtuous live will collectively experience 100 million billion cell divisions, cancer is likely to kill only one of them. One fatal malignancy per 100 million billion cell divisions. (ibid, pp. 141-142)
>
> Given enough time, cancer will strike every human body. (ibid, p.156)

The cancer genome is at first glance a depressing place. Mutations litter the chromosomes. In individual specimens of breast and colon cancer, between fifty to eighty genes are mutated; in pancreatic cancers, about fifty to sixty. Even brain cancers, which often develop at earlier ages and hence may be expected to accumulate few mutations, possess about forty to fifty mutated genes. (Mukherjee, 2010, pp. 451-2)

While the number of mutations that result in cancer vary, it is a slow multi-step process. Mutations occur at random. Not only is the probability low that a mutation will occur in one of the genes that when transformed will be one of the steps leading to cancer; but even a mutation of one of these genes will not necessarily be problematic. For instance, many mutations do not change genes because there is a certain redundancy in the genetic code, that is, several nucleotide combinations can code for the same amino acid (To learn more about the types of gene mutations, see: Wikipedia "Mutation"; Kratz, 2009, pp. 282-3; Lewis, 2005, pp.224-232; Tortora, 2013, pp. 223-226)

While working on this paper, the following was in the morning newspaper:

> STUDY LINKS TWO-THIRDS OF CANCERS TO MUTATED STEM CELLS
>
> Nearly two-thirds of all cancers are caused by random mutations of the body's stem cells, not by hereditary or environmental effect, according to a study released Thursday by Johns Hopkins scientists. Tissues with the most divisions of regenerative cells—and hence the most chances for mutations—tend to have the greatest rates of cancer. . . The faster the mature cells die, the more the replacement cells must divide to keep the tissue population stable. (Fikes, 2015)

Since the above backs up my argument, I guess if I used Olmsted's approach I would stick with the above quotation; but I'm not Olmsted, I don't just rely on newspaper articles. I don't assume that just because one article supports my position, I should rely solely on it. Though some newspaper articles can be quite accurate, the only way to know is to access the actual article, which I did. The article states:

> Some tissue types give rise to human cancers millions of time more often than other tissue types. . . Here, we show that the lifetime risk of cancers of many different types is strongly correlated (0.81) with the total number of divisions of the normal self-renewing cells. . . The majority is due to "bad luck," that is, random mutations arising during DNA replication in normal, noncancerous stem cells. . . Cancers of the small intestinal epithelium are three times less common than brain tumors, even though small

> intestinal epithelial cells are exposed to much higher levels of environmental mutagens. (Tomasetti, 2015, p.78)

Figure 2 in the article gives a number of types of cancers according to association with random mutations or environmental causes. While multiple myeloma isn't listed, several other blood cell cancers are. Blood cells are one of the faster reproducing cells in our bodies. In the environmental list, lung cancer and smoking can be found (Ibid, p.80). So, this is a case where a newspaper journalist did a good job of accurately reporting a scientific study. Even with this, as this paper demonstrates, I do not base my conclusions on one study, regardless of how well done.

Environmental Contributions to Cancer:

According to Weinberg:

> The rarity of cancer-causing mutations stemmed from the inefficiency of mutagenesis. The responsible agents—chemical and physical mutagens—attacked a cell's genome randomly. Since the important target genes such as the proto-oncogenes represented only a minute fraction of the genome, the mutagens would find these crucial targets only randomly. . ., Importantly, mutations appeared to happen at a low but constant rate even without exposure to mutagenic agents. These mutations were seemingly spontaneous and found to be intrinsic to all life forms. Indeed, the evolution of species has depended on the slow, spontaneous change in the base sequences of their DNA. (Weinberg, 1998, p.57)

> This process of DNA replication has flaws. On occasion, a cell will miscopy a sequence of its DNA prior to cell division. . . Even the best-functioning cells will occasionally miscopy one in a million (or ten million) bases during each cycle of DNA replication. Hence, cell growth and division create vulnerability to mutation. . . This imperfection suggested another way cancer formation might be accelerated. ***Agents that promote cell growth will indirectly create mutations simply because they force cells to replicate their DNA. More DNA copying means more inadvertent copying mistakes, more mutations. . . Moreover, it seemed that DNA in the midst of replication was even more susceptible to damage from mutations than DNA from nonproliferating cells.*** [my emphasis] (ibid, p.59)

> While there are some cases of cancer where retroviruses have played a role (e.g. ibid, pp.136-140), there were problems with the attempts to attribute human cancers to tumor virus infections. The most troubling inconsistency came from the epidemiologists, who had shown clearly that most kinds of human cancer do not behave like contagious diseases. When geographic locales of cancer cases were plotted on maps, they seemed to be distributed randomly across the landscape rather than being localized in small, dense clusters, as might be expected from an infectious disease." (ibid, p.27)

Measles and Cancer?

Olmsted writes: "Now the question: Does this suggest that wild-type measles infection, the kind hundreds of thousands of kids caught every year before the measles vaccine arrived in the 1960s, performs some unsuspected function in preventing the occurrence of cancer? And the follow-up: Did mass vaccination wipe out this protection?"

Measles is a systemic infection lasting a week or so. "Measles virus infects multiple organ systems and targets epithelial, reticuloendothelial, and white blood cells, including monocytes, macrophages, and T lymphocytes. . . Complications from measles have been reported in every organ system. Many of these complications are caused by disruption of epithelial surfaces and immunosuppression." (Perry, 2004, p.S4) Thus, multiple cells are damaged or killed resulting in an exponential rate of replacement cell production (cell divisions) and as explained above, this increases the probability of random spontaneous mutations as well as the vulnerability of cells to environmental and viral assaults that could cause mutations.

The attenuated measles vaccine causes a short-lived local infection, enough to allow the immune system to recognize it and develop memory cells (e.g. Benjamin, 2000; Janeway, 2001; Sompayrac , 2003; Tortora, 2013, pp. 478-508). Since virtually all of a cohort of children was infected by measles prior to the development of a vaccine with the vast majority experiencing the "normal" symptomatology, one could hypothesize that, if anything, the vaccine reduced the risk of mutations that could lead to cancer, the opposite of Olmsted's hypothesis. In all honesty, I was unable to find any research that attested to this; but given that prior to vaccinations, almost all children were infected, it would be impossible to find a sufficient number of children testing negative on measles antibodies to carry out a case-control study comparing cancer patients with cancer-free individuals.

In any case, unless Olmsted can come up with an actual mechanism that refutes the above, his is just one more instance of the fantasy world of antivaccinationists lacking any anchoring in reality. However, there is some truth that eliminating vaccinations would reduce the incidence of cancer. Given that cancer is mainly a disease of old age, those dying from vaccine-preventable diseases certainly would avoid dying from cancer. With the exception of the fantasy, unscientific world of the antivaccinationists, the overwhelming consensus among scientists and historians is that vaccinations have been a major contributor to the modern increase in longevity (CDC, 1999; Helmuth, 2013; Riley, 2001; Rosen, 1958).

Besides the use of a modified measles virus to treat multiple myeloma, are there other examples of microbes and/or vaccines used to treat various diseases? And did any of these treatments suggest a particular microbe could also play a preventative role?

Microbes Used in Medicine

In 1884, a German immigrant, Fred K. Stein, lay dying in a hospital from cancer following several years of treatments, including surgeries. "One final indignity remained. . . Stein developed a raging fever and broke out in an angry red infection that galloped across his neck and face. The infection was quickly diagnosed as erysipelas. This disease caused by *Streptococcus pyogenes,* a bacterium related to the germ that causes strep throats, was one of the most common postoperative infections in nineteenth-

century hospitals, with a not inconsiderable mortality rate. . . Stein's attack was quite severe. . . The hospital staff placed him in isolation, and the records note that . . . during the attacks the flabby and apparently sarcomatous granulations have been absorbed . . . Stein was discharged. . . At the time Coley [a young surgeon] rediscovered this case, in the late winter of 1891, no one knew what had become of Fred K. Stein. . . It took Coley . . . at least several weeks to track him down. . . The German explained that he had enjoyed excellent health since his discharge in 1885, and that the cancer had never come back." (Hall, 1997, pp.41-2)

"Anecdotal evidence preceded this episode, including the disappearance of a case of breast cancer following malaria in 1783, cancer cured by gangrene in 1813, and infecting patients with syphilis to vaccinate against future occurrences of cancer as well as reports as late as 1883 asserting cancer cures in patients suffering from syphilis. There was even a claim that prostitutes from antiquity had been free of uterine cancer. In 1929 several cancer patients were treated at Johns Hopkins with tuberculosis and tens of thousands of neurosyphilis patients in the U.S. between 1918 and 1975 were deliberately treated with "a curable form of malaria." Prior to discovering the Stein case, Coley later claimed that by 1890 he had compiled a list of 40 cases where malignancies had disappeared during an accidental erysipelas attack. (ibid, pp.47-49) (for additional readings on malaria as a treatment for syphilis, see Freitas, 2014; Vogel, 2013, p.686)

In 1891, Coley conducted his first treatment intentionally infecting a terminal cancer patient with erysipelas, what today would be called nonspecific immunotherapy. Keep in mind that this was 50 years before penicillin, that erysipelas was highly contagious with a relatively high death rate. The patient survived. After treating twelve patients, two died from erysipelas and eight showed tumor shrinkage, two a complete response.

Coley then decided to inactivate, kill the bacteria; but first combining it with *Bacillus prodigious*, a gram negative bacteria. Gram negative bacteria deliver endotoxins, one of the most powerful stimulants to the immune system known. Coley filtered out though porcelain creating a fluid that has ever since been called "Coley's toxin." (ibid) What he didn't realize, something only discovered many decades later, was that this toxin, and probably the earlier infections with erysipelas, called forth a massive immune response, including tumor necrosis factor which among other things activates CD8 killer T-cells. (Sompayrac, 2003, p.112; Tortora, 2013, pp. 439-440, 466, 496-7)

One version of Coley's approach is still used today. Certain stages of bladder cancer are treated with BCG [*Bacillus Calmette–Guérin*] vaccine injected directly into the bladder together with chemotherapy (National Institute of Cancer, 2014; Shang, 2011); Wang, 2015) (Note. BCG vaccine is still used to protect against tuberculosis with varying claims as to its effectiveness, e.g. Wikipedia "BCG vaccine")

Though not a bacteria or virus, hookworms (helminths) have been used in the treatment of various allergic diseases, including asthma and allergic rhinitis. (Croft, 2012; Feary, 2009ab; Flohr, 2008) Allergies are usually caused by overreaction of the same immune cells, IgE, designed to protect us against worms and similar parasites, so, if these treatments work, it is probable that the worms to some extent redirect these immune cells (Sompayrac, 2001, pp.36-38 and 98-99; Tortora, 2013, pp.484-5)

There is a history of treating cancer and other conditions with various microbes. However, it wasn't the microbe itself that conferred protection; but the immune response to the microbe. I doubt Olmsted is aware of any of the above history nor that any rational person would advocate mass infections with erysipelas, malaria, or hookworms to prevent cancer, syphilis or allergies.

Kanner's Case 3's Multiple Myeloma

According to Olmsted:

> The first thing that caught my eye was the type of cancer – multiple myeloma. As it happens, I've been hearing about this cancer in the autism community quite a bit in the last year. In fact, in August of last year Mark Blaxill and I reported on the anonymous Case 3 in the first medical paper on autism, from 1943. We identified him as William Ritchey Miller of Raleigh, N.C. On his death certificate from July 8, 2011, the cause was listed: multiple myeloma.
>
> According to Wikipedia, this kind of cancer is increasing. and affecting younger people than it has in the past, resulting in about 74,000 deaths in 2010, up from 49,000 in 1990.

Case 3, according to Kanner: "Richard was born on November 17, 1937." (1943, p.225) According to Olmsted, Richard Miller died on July 8, 2011. Thus, Richard Miller died at 73½ years of age, presumably from multiple myeloma; not exactly a great example when you are trying to make the case that "this kind of cancer is increasing and affecting younger people." This is just another example of Olmsted's illogic. Whether multiple myeloma is increasing in younger people or not is obviously irrelevant in Miller's case. The age of Miller's death falls within the historical age range: "the peak age of onset of multiple myeloma is 65 to 70 years of age" (Wikipedia "Multiple Myeloma") [Note. the Wikipedia article used in Olmsted's claim of increasing rates in younger ages includes "Wikipedia:Citation needed" so it may not be accurate] In addition, the increase in deaths given represents global numbers, not US.

According to the American Cancer Society, "the risk of multiple myeloma goes up as people age . . . Most people diagnosed with this cancer are at least 65 years old (American Cancer Society, 2014) The SEER (Surveillance, Epidemiology, and End Results, National Cancer Institute) Incidence and U.S. Death Rates found the vast majority of deaths beginning age 60 (Table 18.7) Table 1 indicates an increase in incidence; but decrease in mortality (ibid); but this Table doesn't indicate age groups, just overall changes over time.

I often use articles in Wikipedia, especially the science articles. An article in the prestigious journal *Nature* compared science articles in Wikipedia with *Encyclopedia Britannica*, finding similar levels of accuracy (Giles, 2005; Wikipedia, Press Release, December 15, 2005). However, I do not rely solely on Wikipedia, either directly checking some of the articles in their reference list or doing an independent search in the National Library of Medicine's online database *PubMed.* Actually, I usually do both. Not only is there no indication that Olmsted did any of the above, but he cites a Wikipedia article that specifically states "Citation needed," just one more example of poor scholarship and science.

Did Kanner Miss A Big Clue?

According to Olmsted referring to Case 3:

> Leo Kanner, the author of that first autism paper, noted that "following smallpox vaccination at 12 months, he had an attack of diarrhea and fever, from which he recovered in somewhat less than a week." (We can assume he had measles.)
>
> While Ritchey recovered physically, Kanner appears to have missed a big clue here. Regarding Ritchey's failure to talk, his mother told Kanner that "I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward mentally gradually for the last two years." His mother made this comment when Ritchey was about three, which puts his regression at the same time as his reaction to the smallpox shot two years earlier. But Kanner, who called the condition he was the first to describe "inborn autistic disturbances of affective contact," seems to have missed clear evidence that Ritchey regressed after a bad reaction to a live virus vaccination.

Kanner writes:

> His mother brought with her copious notes that indicated obsessive preoccupation with details. . . She watched (and recorded) every gesture and every "look."
>
> The mother, in comparing her two children, recalled that while her younger child showed an active anticipatory reaction to being picked up, Richard had not shown any physiognomic or postural sign of preparedness and had failed to adjust his body to being held by her or the nurse. . . Following smallpox vaccination at 12 months, he had an attack of diarrhea and fever, from which he recovered in somewhat less than a week.
>
> In her notes: I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward mentally gradually for the last two years.(Kanner, 1943, pp. 225-226)

The mother was a college graduate and her father a physician. Measles was ubiquitous at the time with a distinct rash that was well-known to those who were raised during this time period. One could, therefore, question why an educated woman, with a propensity towards taking copious notes, would fail to recognize and subsequently document her son's case as suspected measles, or, at the very least, document the presence of a measles-like rash along with the fever and diarrhea? Olmsted's article is about measles, so he assumes the fever and diarrhea indicated measles. It is much more likely that the fever and diarrhea either resulted from the smallpox vaccine or from coincident infection by any number of commonly circulating viruses, or even from mild food poisoning. This is just another example of Olmsted's trying to fit a square peg in a round hole. Olmsted's "we can assume he had measles" is simply nonsensical.

Olmsted seems to have missed Kanner's description of the mother's education level, that her father was a physician, that she took copious notes, and that measles was ubiquitous, including its distinctive rash. What else did he miss?

In his discussion section, Kanner writes:

> It is quite possible that some such children have been viewed as feebleminded or schizophrenia. In fact, several children of our group were introduced to us as idiots or imbeciles, one still resides in a state school for the feebleminded, and two had been previously considered as schizophrenic. . . . Their parents referred to them as having always been "self-sufficient"; "like in a shell"; "happiest when left alone"; "acting as if people weren't there"; . . . There is from the start an *extreme aloneness*. . . According to Gesell, the average child at 4 months of age makes an anticipatory motor adjustment by facial tension and shrugging attitude of the shoulders when lifted. Gesell commented: "It is possible that a less definite evidence of such adjustment may be found as low down as the neonatal period."
>
> It is therefore highly significant that almost all mothers of our patients recalled their astonishment at the children's *failure to assume at any time an anticipatory posture* preparatory to being picked up. . . The average infant learns during the first few months to adjust his body to the posture of the person who holds him. Our children were not able to do so for two or three years. (p.242)
>
> The children's aloneness from the beginning of life . . . We must, then, assume that these children have come into the world with innate inability to form the usual, biologically provided affective contact with people, just as other children come into the world with innate physical or intellectual handcaps [sic]. . . For here we seem to have pure-culture examples of *inborn autistic disturbances of affective contact.* (p.250)

As Kanner writes: "The mother, in comparing her two children, recalled that while her younger child showed an active anticipatory reaction to being picked up, Richard had not shown any physiognomic or postural sign of preparedness and had failed to adjust his body to being held by her or the nurse." Olmsted seems to have missed this.

Olmsted, as with his absurd assumption that fever and diarrhea indicated measles, fails to note that the mother's own notes state: "I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward mentally gradually for the last two years." So, it is just as possible that the problems of imitation preceded the smallpox vaccination. Given the much earlier problems with postural preparedness would make this more likely; but, as with many of the antivaccinationists, Olmsted draws the conclusion that fits his preconceived ideology, ignoring any evidence to the contrary.

Did Kanner's 1943 Article Document a New Syndrome, Autism?

Olmsted writes:

> Our hypothesis is that Ritchey – whose father was a forestry professor at North Carolina State – was exposed to a new ethyl mercury compound, thimerosal, by a new forestry pesticide, and that the other 10 children in that case series were also exposed via vectors including vaccination.

> In short, the first commercial uses of ethyl mercury triggered the first cases of autism; the explosion in vaccines containing it triggered the autism explosion beginning around 1990.

I have planned future articles on thimerosal and the history of the classification/definition of autism, so just a few brief remarks on Olmsted's "first cases of autism." One of the key contentions among antivaccinationists is that autism is a recent syndrome first documented by Leo Kanner in his 1943 article (Kanner, 1943). For some time, in the upper right corner of *Age of Autism's* webpage I found the following: "How Recent Is Autism? So recent that the late great director Mike Nichols, born 11.6.31, was just a few weeks younger than Vivian Murdock, oldest child in the first case study on autism, born 9.13.31. Autism is man-made." (*Age of Autism*, March 2013)

Keep in mind that Olmsted also stated in his article: "But Kanner, who called the condition he was the first to ***describe."*** [my emphasis]

So what did Kanner actually write:

> Since 1938, there have come to our attention a number of children whose condition differs so markedly and uniquely from anything reported so far. (p.217)

> The eleven children (eight boys and three girls) whose histories have been briefly presented offer, as is to be expected, individual differences in the degree of their disturbance, the manifestation of specific features . . . and the step-by-step development in the course of years. But even a quick review of the material makes the emergence of a number of essential common characteristic appear inevitable. These characteristics form a unique "syndrome," not heretofore reported, which seems to be rare enough, yet is probably more frequent than is indicated by the paucity of observed cases. It is quite possible that some such children have been viewed as feebleminded or schizophrenic. In fact, several children of our group were introduced to us as idiots or imbeciles, one still resides in a state school for the feebleminded, and two had been previously considered as schizophrenic." (pp. 241-2)

> The combination of extreme autism, obsessiveness, stereotypy, and echolalia brings the total picture into relationship with some of the basic schizophrenic phenomena. Some of the children have indeed been diagnosed as of this type at one time or another. First of all, even in cases with the earliest recorded onset of schizophrenia . . . the first observable manifestations were preceded by at least two years of essentially average development . . . the children of our group have all shown their extreme aloneness from the very beginning of life.

So, most, if not all, of the first eleven cases seen by Kanner had already been classified as abnormal, either schizophrenic or mentally retarded. Kanner just saw a unique pattern that distinguished them, a new classification. This is nothing new in medicine. History is replete with disorders being recognized and classified or reclassified. I'll just give three historical examples of existing medical conditions that eventually were reclassified.

The Discovery of Measles?

Muhammad ibn Zakariyā Rāzī (also known by his Latinized name Rhazes or Rasis) (854 CE – 925 CE), was a Persian polymath, physician , alchemist and chemist, philosopher and important figure in the history of medicine.

"One of his most innovative assertions related to measles and smallpox. Previously they were lumped together simply as a disease that caused rashes, but through careful observation al-Razi recorded the differences in appearance of the skin inflammations as well as the accompanying physical symptoms, and proposed correctly that they were indeed two distinct diseases." (Science Museum, Abu Bakr Mohammad Ibn Zakariya al-Razi (Rhazes) (c. 865-925))

In his book, *A Treatise on the Smallpox and Measles,* Rhazes "gave the first accurate descriptions of smallpox and measles and distinguished between them." (Pouyan. 2014, p.183; see also: Wikipedia, "Muhammad ibn Zakariya al-Razi"; Ashtiyani, 2010; Modanlou, 2008). Modern researchers, using the now accepted differential descriptions, have been able, using historical documents, to trace measles separate history and distribution, especially its earlier history, that long predated Rhazes book (Cliff, 1993, pp.45-67)

The Discovery of Leukemia?

According to Mukharjee:

> In March 19, 1845, a Scottish physician, John Bennett, had described an unusual case, a twenty-eight-year-old slate-layer with a mysterious swelling in his spleen . . . "In June last he noticed a tumor in the left side of his abdomen." At the autopsy a few weeks later, Bennett was convinced that he had found the reason behind the symptoms. His patient's blood was chock-full of white blood cells. (White blood cells, the principal constituent of pus, typically signal the response to an infection, and Bennett reasoned that the slate-layer had succumbed to one. . .) It would have been a perfectly satisfactory explanation except that Bennett could not find a source for the pus. During the necropsy, he pored carefully through the body . . . But no other stigmata of infection are to be found. The blood had apparently spoiled—suppurated—of its own will, combusted spontaneously into true pus. "A suppuration of blood," Bennett called his case.
>
> A little over four months after Bennett had described the slater's illness, a twenty-four-year-old German researcher, Rudolf Virchow, independently published a case report with striking similarities to Bennett's case.
>
> Virchow, who knew of Bennett's case, couldn't bring himself to believe Bennett's theory. Blood, Virchow argued, had no reason to transform impetuously into anything. Moreover, the unusual symptoms bothered him: What of the massively enlarged spleen? Or the absence of any wound or source of pus in the body? Virchow began to wonder if the blood itself was abnormal. Unable to find a unifying explanation for it, and seeking a name for this condition, Virchow ultimately settled for *weisses Blut*—

white blood—no more than a literal description of the millions of white cells he had seen under his microscope. In 1847, he change the name to the more academic-sounding "leukemia"—from *leukos*, the Greek word for "white."

Renaming the disease—from the florid "suppuration of blood" to the flat *weisses Blut*—hardly seems like an act of scientific genius, but it had a profound impact on the understanding of leukemia. ***An illness, at the moment of its discovery, is a fragile idea, a hothouse flower—deeply, disproportionately influenced by names and classifications*** [my emphasis]. . . Like Bennett, Virchow didn't understand leukemia. But unlike Bennett, he didn't pretend to understand it. His insight lay entirely in the negative. By wiping the slate clean of all preconceptions, he cleared the field for thought.

Virchow and others' research eventually led to the concept of neoplasias, and "by the time Virchow had died in 1902, a new theory of cancer had slowly coalesced . . . Cancer was a disease of pathological hyperplasia in which cells acquired an autonomous will to divide. . . With this understanding, pathologists who studied leukemia in the late 1880s now circled back to Virchow's work. Leukemia, then was not a suppuration of blood, but *neoplasia* of blood. Bennett's earlier fantasy had germinated an entire field of fantasies among scientists, who had gone searching (and dutifully found) all sorts of invisible parasites and bacteria bursting out of leukemia cells. But once pathologists stopped looking for infectious causes and refocused their lenses on the disease, they discovered the obvious analogies between leukemia cells and cells of other forms of cancer. (Mukherjee, 2010, pp. 12-16)

Is Lyme Disease a New Medical Condition?

"***The full syndrome now known as Lyme disease was not recognized until a cluster of cases originally thought to be juvenile rheumatoid arthritis was identified in three towns in southeastern Connecticut in 1975*** [My emphasis]. . . Before 1976 elements of *B. Burgdorferi sensu late* infection were called or known as tick-borne meaningopolyneuritis, Garin-Bujadoux syndrome, Bannwarth syndrome, Afzelius' disease, Montauk Knee or she tick fever." (Wikipedia, "Lyme Disease", p. 12) "Borrelia are microaerophilic and slow-growing—the primary reason for the long delays when diagnosing Lyme disease—and have been found to have greater strain diversity than previously estimated." (Wikipedia, "Lyme Disease Microbiology") The causal agent, a spirochete, was finally isolated in 1980 by Willy Burgdorfer and published in the journal *Science* in June 1982 resulting in the spirochete being named Borrelia burgdorferi in his honor.

"Jonathan Edlow, Professor of Medicine at Harvard Medical School, quotes the late Ed Masters (discoverer of STARI , a Lyme-like illness) in his book *Bull's-Eye* , on the history of Lyme disease. Edlow writes:

> Masters points out that the "track record" of the "conventional wisdom" regarding Lyme disease is not very good: "First off, they said it was a new disease, which it wasn't. Then it was thought to be viral, but it isn't. Then it was thought that sero-negativity didn't exist, which it does. They thought it was easily treated by short courses

> of antibiotics, which sometimes it isn't. Then it was only the Ixodes dammini tick, which we now know is not even a separate valid tick species. If you look throughout the history, almost every time a major dogmatic statement has been made about what we 'know' about this disease, it was subsequently proven wrong or underwent major modifications. (Quoted in Wikipedia, "Lyme Disease", p.12; original from Edlow, 2003, p.191)

The Wikipedia article gives an excellent history of Lyme Disease, including extensive references. (pp. 11-13) The first description in North America dates back to Colonial times and the spirochete was found in a Museum specimen from the late Nineteenth Century. Early descriptions exist in Europe as well.

"Lyme disease can affect multiple body systems and produce a broad range of symptoms. Not all patients with Lyme disease will have all symptoms, and many of the symptoms are not specific to Lyme disease, but can occur with other diseases as well." (Wikipedia, "Lyme Disease" pp.1-2) After the deforestation in New England to create farmland, the changed ecology resulted in reduction of the disease vectors. As farms were abandoned, forest reappeared as more and more homes were built adjoining the newly emerging forests. What had for many years been sporadic cases with various overlapping signs and symptoms became clusters, finally resulting in recognition of a distinct syndrome and discovery of the causal spirochete. (Wikipedia, "Lyme Disease"; Edlow, 2003; Ostfield, 2011)

In the Tenth Century Rhazes distinguished two diseases, measles and smallpox, from what was originally seen as one disease. Does this mean that measles was a new disease? Bennett thought exponentially increasing amounts of white blood cells and a swollen spleen indicated an infection. Thanks to Virchow and others, we now know that it was leukemia, a *neoplasia* of the blood. Increases in white blood cell counts still often indicated an infection; but once the two were differentiated, research could progress on the differences in diagnostic criteria, causes, and, of course, treatment. Was leukemia a new disease discovered in the 1880s? And, in at the later 1970s, Lyme Disease was "discovered." In none of these cases were the diseases "new" in the sense that they did not exist earlier; but the "new" was the recognition of their distinct signs and symptoms and, of course, classification.

As stated above, this section is intentionally brief, just to whet the whistle of the curiosity of those with open minds. Since it will probably be sometime before I get around to writing a more extensive article, I suggest the following readings:

> Grinker, Roy Richard. (2007) Chapter 2: Theme and Variation: The "Discovery" of Autism. *Unstrange Minds: Remapping the World of Autism.* Cambridge, MA; Basic Books, pp. 37-65.
>
> Evans, Bonnie Evans. (2013). How Autism Became Autism: The Radical Transformation of a Central Concept of Child Development in Britain. *History of the Human Sciences,* 26(3): 3-31. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3757918/

Volkmar, Fred R. & McPartland, James C. (2014). From Kanner to DSM-5: Autism as an Evolving Concept. *Annual Review of Clinical Psychology,* 10: 193-212.

Volkmar, Fred R., Reichow, B, & McPartland. (2012) Classification of Autism and Related Conditions: Progress, Challenges, and Opportunities. *Dialogues in Clinical Neuroscience,* 14(3): 229-237. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3513678/

Do Vaccines Overload Our Immune Systems?

According to Olmsted: "It is not hard to imagine that an immune system so dysfunctional it 'does nothing' could spawn all kinds of mayhem, including cancerous cells. On Thursday I quoted from a new scientific paper "that presents convincing evidence that the rapid increase in the number of vaccines given to US children has now created a state of immune overload in the majority, or close to the majority, of young US children and that this is being manifested by related health issues including epidemics of obesity, diabetes, and autism."

Some Immune System Basics:

An understanding of some basics of the immune system is necessary in order to determine the validity of claims that vaccines cause an overloading of the immune system. The immune system is roughly divided into the innate immune system and the adaptive immune system. The innate immune system in turn consists of a number of parts, one of these involves antigen presenting cells. These cells, including dendritic cells and macrophages, patrol our bodies. Any time they come in contact with something "foreign," they engulf it, break it into smaller bits, and present these smaller bits on the outside of the cell. While doing this, they leave their patrol stations and journey to lymph nodes, entertainingly called "dating sites" by Sompayrac (2003), where attempts are made to match the small bits with receptors on B cells. Each B cell has a different receptor. The antigen presenting cell and the B-cell receptors work something like locks and keys. The foreign bodies are called antigens and the smaller bits are called antigenic determinants or epitopes. It is important to understand that the adaptive immune system does not recognize "whole" invaders, doesn't recognize whole bacteria, whole viruses, or whole protozoa, only small bits, for instance, a few amino acids from a much larger protein. Once matched, B cells undergo a transformation to Plasma Cells which are the factories that produce antibodies, also called the humoral arm of the acquired immune system. The other main arm of the acquired immune system consists of T-cells, also called the cellular immune system. The major differences between the innate immune system and the acquired immune system is that the innate system provides a generalized rapid defensive response whereas the adaptive immune system is highly specific and takes time to rev up; but they also work together. In many cases, the innate system's response is enough to protect us; but when it fails, though it may help delay/slow down invaders, the adaptive immune system provides the two of a one-two punch. Although the above is an overly simplified description of certain aspects of our immune response; it should be sufficient for now. For those who would like to delve more into our immune systems, the following is a good start:

Tortora, Gerald J., Funke, Berdell R. & Case, Christine L. (2013). Chapter 16: Innate Immunity: Nonspecific Defenses of the Host and Chapter 17: Adaptive Immunity:

Specific Defenses of the Host. *Microbiology: An Introduction* (11th ed.) Boston: MA: Pearson (pp 451-503)

Sompayrac, Lauren. (1993) *How the Immune System Works* (2nd Edition). Malden, MA: Blackwell Publishing.

Benjamin, Eli, Coico, Richard, & Sunshine, Geoffrey. (2000) *Immunology: A Short Course,* 4th Edition. New York: John Wiley.

How Many Microbes Is Our Immune System Designed to Handle At Any Given Time?

According to Cohn: "The Protecton [the minimum concentration of antibody per milliliter required to remove invaders] is capable of handling a maximum steady state epitopic load of the order of 5×10^3 without . . . being functionally unresponsive to a new antigen." It is important to keep in mind that each milliliter, each Protecton, does not contain the exact same assortment of antibodies. For example: "the total number of amino acid sequence variants in complementarity-determining regions of Ig exceeds 10^6, the number of functionally different antibodies expressed per Protecton is only 5×10^3." (Cohn, p.66) For a more detailed discussion of the Protecton, see the Appendix.

Just to summarize, any single Protecton is capable of dealing with up to 5×10^3 (5,000) antigens at one time without compromising its ability to respond to a new invader and different Protectons can respond to different combinations of invaders.

Actually, one could consider the "Protecton" as a conservative estimate of the immune systems capability. Others just list the total estimated number of B-cells and T-cells. For instance, "the human immune system is capable of recognizing a mind boggling number of different antigens—estimates are of a minimum of 10^{15} antigens." (Tortora, 2013, p. 487, see also: Benjamini, 2000, p. 129)

Offit writes;

> Although we now give children more vaccines, the actual number of antigens they receive has declined. Whereas previously 1 vaccine, smallpox, contained about 200 proteins, now the 11 routinely recommended vaccines contain fewer than 130 proteins in total. Two factors account for this decline: first, the worldwide eradication of smallpox obviated the need for that vaccine, and second, advances in protein chemistry have resulted in vaccines containing fewer antigens (e.g., replacement of whole-cell with acellular pertussis vaccine).
>
> If vaccines overwhelmed or weakened the immune system, then one would expect lesser immune responses when vaccines are given at the same time as compared with when they are given at different times [which has not been found].
>
> Vaccines may cause temporary suppression of delayed-type hypersensitivity skin reactions or alter certain lymphocyte function tests in vitro. However, the short-lived immunosuppression caused by certain vaccines does not result in an increased risk of infections with other pathogens soon after vaccination. Vaccinated children are not at

> greater risk of subsequent infections with other pathogens than unvaccinated children. (Offit, 2002, pp. 126-127; see also: Vaccine Education Center, 2012)

A review by the Institute of Medicine's Immunization Safety Review Committee states:

> [the Committee] reviewed the evidence regarding the hypothesis that multiple immunizations increase the risk for immune dysfunction. . . the committee found that the epidemiological evidence (i.e. from studies of vaccine-exposed populations and their control groups) favors rejection of a causal relationship between multiple immunizations and increased risk for infections and for type 1 diabetes. . . These immune disorders carry heavy individual and societal burdens, and serious vaccine-preventable disease could increase if parents unnecessarily avoid immunizing their children due to continuing concerns about this issue. (Institute of Medicine, 2002, pp.1-2)
>
> Central to the concerns about multiple childhood immunizations is whether the recommended schedule overloads an infant's immune system. . . Calculations reviewed by the committee suggest that the number of antigens contained in the complete series of vaccines that comprise the recommended childhood immunization schedule has actually decreased over the past 20 to 30 years, despite the increased number of vaccines and vaccine doses administered. (ibid, p.6)

A more recent Institute of Medicine study states:

> Certain segments of the population, including premature infants, children born into families with histories of autoimmune disease, and children with genetic traits not yet identified that confer an increased chance of developing diseases having autoimmune features, could be vulnerable both to putative harmful effects of vaccination and, conversely, to the absence of protection from vaccine-preventable diseases should they not be vaccinated. The benefits of immunization to such possibly vulnerable populations could surpass those to children in nonvulnerable groups, allowing them to avoid vaccine-preventable diseases that, although mild for others, could be severe for them. (Institute of Medicine, 2013, p.107)

The WHO Global Advisory Committee on Vaccine Safety concluded: "The available evidence reviewed by GACVS does not support the hypothesis that vaccines, as currently used, weaken or harm the immune system (WHO, 2006, p.275)

As an example, one study concluded: [that] "combined measles, mumps, and rubella (MMR) vaccine did not increase the risk of hospitalisation with invasive bacterial infection in the three months after vaccination; rather there was a protective effect." (Miller, 2003, p.222)

Another recent study, using a case-control design, found no association between the number of antigens in vaccines and risk of autism (deStefano, 2013). A critique of this study by deSoto was responded to and refuted by deStefano and co-authors (Letters to the Editor, 2013). Though I would never rely on one study or even a few, regardless of how well done, this study

simply confirms what I discussed above, that is, what we know about the immune system as well as reviews by the Institute of Medicine and WHO.

The key points are:

1. Vaccines are composed of either killed antigens or highly weakened (attenuated) ones. Take measles vaccine (an attenuated vaccine) as an example compared with a natural case of measles. One causes a short-lived local reaction, just enough for the immune system to recognize it and develop memory cells as opposed to a system-wide infection that rages for a week or so.
2. Several vaccines, composing some combination of killed and/or attenuated antigens, would still elicit a much smaller immune reaction than one full-blown natural case of any of the microbes vaccinated against.
3. Infants are exposed to 1,000s of antigens daily, through the air they breathe, the food and drink they consume, and the minor scrapes and cuts of everyday life, which could include several of the vaccine-preventable diseases, either concurrently or, as usually happened, consecutively.
4. One hundred years ago, children were exposed to, probably, more microbes than today (less sanitary conditions, working in factories, etc.); yet the conditions allegedly associated with multiple vaccinations causing immune overload were less prevalent.
5. Finally, as the IOM report made clear, if an infant, due to some existing condition, would react adversely to the vaccines, then, in all likelihood, the natural disease results would be the same or worse.

In other words, based on the above, a rational choice would be to vaccinate one's infant.

Bart Classen's Recent Paper on Vaccine Induced Immune Overload:

Olmsted seems to rely on one article by Classen:

Classen, J. Barthelow. (2014) Review of Vaccine Induced Immune Overload and the Resulting Epidemics of Type 1 Diabetes and Metabolic Syndrome, Emphasis on Explaining the Recent Accelerations in the Risk of Prediabetes and other Immune Medicated Diseases, *Journal of Molecular and Genetic Medicine,* S1-025

There is no indication that Olmsted has tried to learn about the immune system or, if he did, that he understood any of the above. It would take a separate paper to give a detailed review of Classen's article. However, a few points should raise some red flags as to its credibility and, at the same time, question why Olmsted would rely on it, that is, besides the fact that, as usual for many antivaccinationists, he relies on one article because it confirms his beliefs.

According to Classen: "Since 1999 the routine pediatric immunization schedule increased by 80 vaccines. This number is derived by the fact that multivalent vaccines contain specific vaccines to each separate strain. The following have been added, pneumococcus (13 valent), meningococcus (4 valent), human papilloma virus (4 valent), hepatitis A (1 valent), rotatavirus (4 additional valent), influenza (3

valent per year x 18 years=54)." (Classen, 2014, pp.1-2) Quite accurate; but historically the total number of immunogenic proteins and polysaccharides contained in vaccines, even with the addition of 80 since 1999, is much lower than the total number contained in vaccines between 1960 to 1980 (see Table 2 below from Offit). Note that Table 2 doesn't include vaccines added to the list after year 2000, Classen's 80, would increase the year 2000 total of 123-126 to 203-206. Compare this with 1960's Total of 3217 or 1980s Total of 3041.

"Infants and children are exposed to many germs every day just by playing, eating, and breathing. Their immune systems fight those germs, also called antigens, to keep the body healthy. The amount of antigens that children fight every day (2,000-6,000) is much more than the antigens in any combination of vaccines on the current schedule (150 for the whole schedule). So children's immune systems are not overwhelmed by vaccines." (American Academy of Pediatrics, 2008) Keep in mind that the 2,000 to 6,000 antigens children are exposed to every day are fully live whereas vaccines contain killed or attenuated (extremely weakened) microbes. Vaccines are designed to elicit a minimal local response, just enough for the immune system to recognize them and develop memory cells ready to respond if ever confronted with them again (see Wikipedia, "Immune System"; Tortora, 2013, Chapter 17, pp.478-501; Sompayrac, 2003).

Keep in mind that these are not given all at once; but over a period of 18 years, most given before age six; but, still not given at once. As discussed above, the immune system is continually being renewed. Table 1 from Offit, again based on the recommended vaccinations in 2000, gives the maximum possible injections at a single visit. The most up-to-date vaccine schedule (referenced in Classen) gives a possible maximum at any one time prior to age 1 as 7; but 3 of these, HepB, Polio, and Influenza need not be given at the same time as the other 4 (CDC, 2013) An eighth vaccine for meningococcus is only recommended for high risk groups and given a wide age range (ibid).

From Offit (2002, p.125)

TABLE 1. Number of Vaccines & Possible Number of Injections Over the Past 100 Yrs

TABLE 1. Number of Vaccines & Possible Number of Injections Over the Past 100 Years			
Year	Number of Vaccines	Possible Number of Injections by 2 Years of Age	Possible Number of Injections at a Single Visit
1900*	1	1	1
1960†	5	8	2
1980‡	7	5	2
2000§	11	20	5

* In 1900, children received the smallpox vaccine.
† In 1960, children received the smallpox, diphtheria, tetanus, whole-cell pertussis, and polio vaccines. The diphtheria, tetanus, and whole-cell pertussis vaccines were given in combination (DTP), and the polio vaccine (inactivated) was given as a series of 3 injections.
‡ In 1980, children received the DTP, polio, and MMR vaccines. The DTP and MMR vaccines were given in combination and the polio vaccine (live, attenuated) was given by mouth.
§ In 2000 children received the diphtheria-tetanus-acellular-pertussis, MMR, inactivated polio, Hib, varicella, conjugate pneumococcal, and hepatitis B vaccines.

From Offit (2002, p.127)

TABLE 2. Number of Immunogenic Proteins and Polysaccharides Contained in Vaccines Over the Past 100 Years

1900		1960		1980		2000	
Vaccine	Proteins	Vaccine	Proteins	Vaccine	Protein	Vaccine	Proteins/ Polysaccharide
Smallpox*	~200	Smallpox	~200	Diphtheria	1	Diphtheria	1
Total	**~200**	Diphtheria†	1	Tetanus	1	Tetanus	1
		Tetanus‡	1	WC - Pertussis	~3000	AC - Pertussis¶¶	2-5
		WC - Pertussis§	--3000	Polio	15	Polio	15
		Polio‖	15	Measles¶	10	Measles	10
		Total	**3217**	Mumps#	9	Mumps	9
				Rubella**	5	Rubella	5
				Total	**~3041**	Hib††	2
						Varicella‡‡	69
						Pneumococcus§§	8
						Hepatitis B ||||	1
						Total	**123-126**

* Vaccinia vaccine: Gobble SJ, Johnson GP, Perkus ME, *et al.* Virology. 1990;179:247–266.
† Diphtheria toxoid: MMWR Morb Mortal Wkly Rep. 1991 (August);40:1–28.
‡ Tetanus toxoid: MMWR Morb Mortal Wkly Rep. 1991 (August);40:1–28.
§ Whole cell pertussis vaccine: Number estimated from genome size. The sequence of Bordetella pertussis Tohama I strain will soon be
completed at the Sanger Center in Great Britain.
‖ Polio vaccine: Wimmer E, Nomoto A. Biologicals. 1993;21:349–356; Kitamura N, Semler BL, Rothberg PG, *et al.* Nature. 1981;291:547–553;
Five proteins per poliovirus virion and 3 poliovirus strains in the inactivated poliovirus vaccine (IPV).
¶ Measles vaccine: Griffen D, Bellini WL. Measles virus. In: Fields BN, ed. Knipe DM, Howley PM, et al, eds. Philadelphia, PA:
Lipincott-Raven Publishers; 1996.
Mumps vaccine: Elango N, Varsanyi TM, Kovamees J, Norrby E. J Gen Virol. 1988;69:2893–2900.
** Rubella vaccine. Hofmann J, Gerstenberger S, Lachmann I, *et al.* Virus Res. 2000;68:155–160.
†† Conjugate Haemophilus influenzae type b vaccine: MMWR Morb Mortal Wkly Rep. 1991 (January);40:1–7.
‡‡ Varicella vaccine: Cohen JI. Infect Dis Clin North Am. 1996;10:457–468.
§§ Streptococcus pneumoniae vaccine: MMWR Morb Mortal Wkly Rep. 2000;49:1–29.
|||| Hepatitis B vaccine: MMWR Morb Mortal Wkly Rep. 1991 (November);40:1–25.
¶¶ Acellular pertussis vaccine: MMWR Morb Mortal Wkly Rep. 1997 (March);46:1–25.

Classen's paper does not include the Protecton nor any other information about the capacity of our immune system to deal with multiple antigens as discussed above, nor the fact that our immune system is constantly renewing. Classen does not discuss the spacing of vaccines and, thus, that the number of antigens at any one time are small, especially in comparison with the constant barrage of antigens confronting a child each and every day. Nor does he discuss the fact that antigens in vaccines are killed or attenuated, thus, requiring a much smaller immune system response than the live microbes encountered daily. And Classen does not mention the much higher number of antigens in vaccines between 1960 and 1980 and, thus, gives no explanation why today's significantly lower number would cause increases in Type 1 Diabetes and the Metabolic Syndrome.

Classen's paper, though titled "Review" is not a systematic review. "A systematic review is a literature review focused on a research question that tries to identify, appraise, select and synthesize ***all*** [my emphasis] high quality research evidence relevant to that question. . . ***A systematic review aims to provide an exhaustive summary of current literature relevant to a research question*** [my emphasis]. The first step of a systematic review is a thorough search of the literature for relevant papers. The *Methodology* section of the review will list the databases and citation indexes searched . . . as well as any hand searched individual journals. Next, the titles and the abstracts of the identified articles are checked against pre-determined criteria for eligibility and relevance. . . each included study may be assigned an objective assessment of methodological quality . . . A systematic review uses an objective and transparent approach for research synthesis, with the aim of minimizing bias." (Wikipedia, "Systematic Review; see also: The Cochrane Collaboration, 2011; National Guideline Clearinghouse, 2014; Cooper, 1994; Light, 1984; Murrow, 1998)

According to Classen: "Extensive evidence links vaccine induced immune over load with the epidemic of type 1diabetes." (Classen, 2014, p.1)

Nowhere in his paper does he mention the Institute of Medicine report that states:

> The framework allows the committee to "favor rejection" of a causal relationship only in the face of epidemiologic evidence rated as high or moderate in the direction of no effect (the null) or of decreased risk and in the absence of strong or intermediate mechanistic evidence in support of a causal relationship. The committee concluded the evidence favors rejection of five vaccine–adverse event relationships. These include MMR vaccine and type 1 diabetes, diphtheria, tetanus, and pertussis (DTaP) vaccine and type 1 diabetes, MMR vaccine and autism, inactivated influenza vaccine and asthma exacerbation or reactive airway disease episodes, and inactivated influenza vaccine and Bell's palsy. The evidence base for these conclusions consisted of epidemiologic studies reporting no increased risk; this evidence was not countered by mechanistic evidence. (Institute of Medicine, 2012, p. 23)

A scholarly systematic review would include this and would then discuss any flaws/disagreements with the IOM's methodology and conclusions. Not only does Classen not mention the IOM report; but not one of the studies they reviewed is included in his reference list:

> Altobelli, E., R. Petrocelli, A. Verrotti, and M. Valenti. 2003. Infections and risk of type I diabetes in childhood: A population-based case-control study. *European Journal of Epidemiology* 18(5):425-430.
>
> Blom, L., L. Nystrom, and G. Dahlquist. 1991. The Swedish childhood diabetes study. Vaccinations and infections as risk determinants for diabetes in childhood. *Diabetologia* 34(3):176-181
>
> DeStefano, F., J. P. Mullooly, C. A. Okoro, R. T. Chen, S. M. Marcy, J. I. Ward, C. M. Vadheim, S. B. Black, H. R. Shinefield, R. L. Davis, and K. Bohlke. 2001. Childhood vaccinations, vaccination timing, and risk of type 1 diabetes mellitus. *Pediatrics* 108(6):E112.

Hviid, A., M. Stellfeld, J. Wohlfahrt, and M. Melbye. 2004. Childhood vaccination and type 1 diabetes. *New England Journal of Medicine* 350(14):1398-1404.

Fescharek, R., U. Quast, G. Maass, W. Merkle, and S. Schwarz. 1990. Measles-mumps vaccination in the FRG: An empirical analysis after 14 years of use. II. Tolerability and analysis of spontaneously reported side effects. *Vaccine* 8(5):446-456.

Karavanaki, K., E. Tsoka, C. Karayianni, V. Petrou, E. Pippidou, M. Brisimitzi, M. Mavrikiou, K. Kakleas, I. Konstantopoulos, M. Manoussakis, and C. Dacou-Voutetakis. 2008. Prevalence of allergic symptoms among children with diabetes mellitus type 1 of different socioeconomic status. Pediatric *Diabetes* 9(4 Pt 2):407-416.

Patterson, C. C. 2000. Infections and vaccinations as risk factors for childhood type I (insulin dependent) diabetes mellitus: A multicentre case-control investigation. *Diabetologia* 43(1):47-53.

Telahun, M., J. Abdulkadir, and E. Kebede. 1994. The relation of early nutrition, infections and socio-economic factors to the development of childhood diabetes. Ethiopian Medical Journal 32(4):239-244.

Thivolet, C., B. Vialettes, C. Boitard, and J. Bringer. 1999. No evidence that anti hepatitis B vaccine causes insulin dependent diabetes [in French]. *Diabetes and Metabolism* 25(5):441-445.25(5):441-445.

Classen maintains that vaccinations resulting in immune overload have played a major role in the rise of the metabolic syndrome. "Metabolic syndrome is a disorder of energy utilization and storage, diagnosed by a co-occurrence of three out of five of the following medical conditions: abdominal (central) obesity, elevated blood pressure, elevated fasting, plasma glucose, high serum triglycerides, and low high-density cholesterol (HDL) levels. Metabolic syndrome increases the risk of developing cardiovascular disease, particularly heart failure, and diabetes." (Wikipedia, "Metabolic Syndrome")

Just one of several credible alternative causal explanations for the metabolic syndrome is the role of sugar intake in our diet, especially fructose. Both honey and table sugar are disaccharides, that is composed of two monosaccharides, glucose and fructose. "An ever-increasing percentage of calories in the American diet are derived from fructose. Before 1900, Americans consumed approximately 15 g/day fructose (4% of total calories), mainly through fruits and vegetables. Before World War II, fructose intake had increased to 24 g/day; by 1977, 37 g/day (7% of total calories); by 1994, 55 g/day (10% of total calories); and current estimates put fructose consumption by adolescents at 73 g/day (12% of total calories). Current fructose consumption has incrementally increased fivefold in the last century and doubled in the last 30 years." The article goes on to describe the various metabolic pathways involved (Lustig, 2010. p.1207; see also: Lustig, 2012a; Lustig, 2012b; Taube, 2007; Taube, 2011; Yang, 2014)

Another credible alternative hypothesis not discussed by Classen is the role of various environmental chemicals causing endocrine disruption which, in turn, has been found to be associated with the metabolic syndrome, including type 2 diabetes (e.g. Chevalier, 2014).

According to Wikipedia: "Endocrine disruptors are chemicals that, at certain doses, can interfere with the endocrine (or hormone) system in mammals. These disruptions can cause cancerous tumors, birth defects, and other developmental disorders.[1] Any system in the body controlled by hormones can be derailed by hormone disruptors. Specifically, endocrine disruptors may be associated with the development of learning disabilities, severe attention deficit disorder, cognitive and brain development problems; deformations of the body (including limbs); breast cancer, prostate cancer, thyroid and other cancers; sexual development problems such as feminizing of males or masculinizing effects on females, etc. The critical period of development for most organisms is between the transition from a fertilized egg into a fully formed infant. . . [Included among the chemicals discussed] almost all plastic products, including those advertised as "BPA free", have been found to leach endocrine-disrupting chemicals." (Wikipedia, "Endocrine Disrupters")

According to Hill: "The Environmental Protection Agency (EPA) oversees the safety of more than 70,000 chemicals used commercially in the United States. Of these, fewer than 1% are on its Toxic Release Inventory (TRI) of chemicals whose discharge must be reported—and those only in certain cases. Decades can pass before the use of a highly toxic chemical is banned and tightly regulated." (Hill, 2014, p.25) So, while the number of antigens contained in vaccines has decreased, the number of chemicals we are exposed to has increased. What's more, it is possible that various chemicals work in a synergistic manner, that is, small quantities of any particular chemical may alone not be found associated with some health/medical problem; but two or more may; but, unfortunately, epidemiological studies of the interactions between several chemicals would be almost impossible. Though lab studies on animals could be carried out, it would be impossible to look at the all combinations of the 70,000 chemicals or even a subset and, though often relied on, what affects animals doesn't always affect humans and *vice versa.* (see also: The American College of Obstetricians and Gynecologists, 2013; Bell, 2015; Miodovnik, 2011; Schapiro, 2007)

Classen writes: "Many hypothesis have been proposed to find alternate explanations for these epidemics, such as the hygiene hypothesis for autoimmune diseases and poor diet or decreased exercise for the obesity epidemic. These hypothesis don't readily explain the recent changes in the rates of these diseases. For example the prevalence of obesity in US children has stabilized while junk food and leisure activities persists, and the epidemics of autoimmune diseases continue to rise at a time where hygiene does not seem to increase. (Classen, 2014, p.1) Not only does he not elaborate on this; but gives no references. Are we to just take his word for it? And, as with many other medical problems, the metabolic syndrome may have several component "causes" and/or the "cause" for any specific individual may differ.

This is not the place to debate the various explanations/alternative hypotheses for the metabolic syndrome. However, one would think that in reviewing vaccinations and the metabolic syndrome that Classen would, at least, mention the alternative hypotheses of increased sugar intake in our diets and endocrine disrupting chemicals and discuss why he believes his hypothesis should be given more weight.

A good review should include all reasonable alternative hypotheses. As Susser explains: "An ideal test will be crucial, that is, the outcome will eliminate one or more of the competing hypotheses. . . Analytical models are constructed to represent alternate hypotheses, which can be subjected to crucial tests." (Susser, 1973, p.34) Or as Rothman writes: "Such an approach avoids the temptation to use causal criteria simply to buttress pet theories at hand, and instead allows epidemiologists to focus on evaluating competing causal theories using crucial observation." (Rothman, 1998, p.28)

Classen writes: "Data from the United States shows that the epidemic of obesity in children 12-19 has ended however during a time when there was no increase in obesity in children age 12-19 the rates of prediabetes or diabetes increased from 9% to 23%." (Classen, 2014, p.2) The article he refers to by May states:

> A consistent dose-response increase in the prevalence of each of these CVD risk factors was observed by weight categories: the estimated 37%, 49%, and 61% of the overweight, obese, and normal-weight adolescents, respectively, had at least 1 of these CVD risk factors during the 1999 through 2008 study period (May, 2012 Jun, p.1035)
>
> In 2009-2010, an estimated 34% of US adolescents aged 12 to 19 years were overweight or obese. (ibid, p.1036)
>
> There was ***no significant change in the prevalence of overweight, obesity*** [my emphasis] (ibid, p.1037) [However, from the article's TABLE 2, though not statistically significant, there is a slight increase over the five time periods] (ibid, p.1038)
>
> The ***plateauing*** [my emphasis] of the prevalence of several CVD risk factors is not surprising when one considers that the ***prevalence of obesity*** [my emphasis], a frequent precursor to the risk factors examined here, ***did not increase significantly*** [my emphasis] for most youth in our or another NHANES study.(Ibid, p.1040)

The article clearly states an "increase in the prevalence of each of these CVD risk factors was observed by weight categories"; however, together with the high percentage of overweight and obese children in the US, the fact that obesity isn't increasing further hardly means that "the epidemic of obesity in children 12-19 has ended".

The above isn't meant to be a complete review of Classen's article. The main point is that Classen's article represents a case of confirmation bias, cherry picking articles in an extremely one-sided presentation and, perhaps, misrepresenting what some of the articles referred to actually stated. If he had discussed how the immune system worked (see above); if he had included reports and articles that had different conclusions than his and explained why he disagreed with them;, if he had included all credible alternative hypotheses and explained why he disagreed with them, then, maybe, his paper would have had some validity; but he didn't. Classen attempts to explain the relationship between vaccines, immune system overload, metabolic syndrome, and diabetes. Unfortunately, as Rothman explains: "biologic plausibility of the hypothesis, an important concern but one that is far from objective or absolute. . . the problem with plausibility: It is too often not based on logic or data, but only on prior beliefs. This is not to say that biologic knowledge should be discounted when a new

hypothesis is being evaluated, but only to point out the difficulty in applying that knowledge". (Rothman, p.26)

Olmsted's reliance on one article can be partly explained by Confirmation Bias; but Confirmation Bias is not the entire picture. The following two sections should make clear why Olmsted, founder, owner, and chief editor of *Age of Autism*, lacks any credibility, why he literally doesn't know what he is talking about. And, assuming that as chief editor and owner, he has the final say or, at least, a major say in articles posted on *Age of Autism,* the entire website lacks credibility.

Is Olmsted a "Citizen Scientist?"

Olmsted opens his article with "a lot of us 'citizen scientists . . .'" Let's systematically evaluate this claim.

What is science? According to Wikipedia:

> Science (from Latin scientia, meaning "knowledge") is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about nature and the universe. . . In modern usage, "science" most often refers to a way of pursuing knowledge, not only the knowledge itself. . . over the course of the 19th century, the word "science" became increasingly associated with the scientific method itself, as a disciplined way to study the natural world. (Wikipedia, "Science", p.1)
>
> A scientific theory is empirical and is always open to falsification if new evidence is presented. That is, no theory is ever considered strictly certain as science accepts the concept of fallibilism. The philosopher of science Karl Popper sharply distinguishes truth from certainty. He writes that scientific knowledge "consists in the search for truth", but it "is not the search for certainty". All human knowledge is fallible and therefore uncertain. (ibid, p.5)
>
> "The successful sciences trust, not to any single chain of inference (no stronger than its weakest link), but to the cable of multiple and various arguments intimately connected. (ibid, p.6)
>
> Statistical methods , which are mathematical techniques for summarizing and analyzing data, allow scientists to assess the level of reliability and the range of variation in experimental results. Statistical analysis plays a fundamental role in many areas of both the natural sciences and social sciences. (ibid, p.8)

According to Wikipedia: "A scientist, in a broad sense, is one engaging in a systematic activity to acquire knowledge. In a more restricted sense, a scientist may refer to an individual who uses the scientific method." (Wikipedia, "Scientist", p.1)

A recent book, well-worth reading, from the Institute of Medicine, "*On Being a Scientist: A Guide to Responsible Conduct in Research"* presents an overview of the professional standards of science and explains why adherence to these standards is essential for continued scientific progress (National

Academy of Sciences, 2009, p. ix). “Research is based on the same ethical values that apply in everyday life, including honesty, ***fairness, objectivity*** [my emphasis]**,** openness, trustworthiness, and respect for others. (ibid, p.3)

What is a citizen scientist? According to Wikipedia: “Formally, citizen science has been defined as "the systematic collection and analysis of data; development of technology; testing of natural phenomena; and the dissemination of these activities by researchers on a primarily avocational basis”. Citizen science is sometimes called ‘public participation in scientific research.’” (Wikipedia, “Citizen Science”) Perhaps, Olmsted really meant “amateur scientist;” but, unfortunately, this too requires the same approach as defined by citizen scientist (e.g. Mims, 1999).

Reviews and developments of hypotheses (see above), to be considered scientific, require the same “fairness and objectivity”, the same “systematic collection of data” as any scientific endeavor.

In a recent post, Olmsted writes: “I am not a chi square guy [he doesn’t understand statistics]. I'm an English major. I am in no position to evaluate the techniques used to calibrate the autism rate in black males, or anybody else, before or after the MMR shot.” (Olmsted, August 30, 2014) In another recent post, Olmsted writes: “At least, that is my opinion, based on my own research, experience, and professional training.” (Olmsted, December 10, 2014)

What about his “professional training?” Olmsted is or was a journalist. According to Wikipedia: “Reporters are expected to be as accurate as possible. . . Independent ***fact-checking*** [my emphasis] by another employee of the publisher is desirable. . . Advocacy journalists — a term of some debate even within the field of journalism — by definition tend to reject "objectivity", while at the same time maintaining many other common standards and ethics. . . The New York Times , for instance, tends to print longer, more detailed, less speculative, and more ***thoroughly verified pieces*** [my emphasis] a day or two later than many other newspapers. ”(Wikipedia, “Journalism Ethics and Standards”)

“Journalists need the time, space and resources to verify what they are being told and to compare different sources, and introduce an element of balance into their work.” (White, p.42) “The best of traditional journalism such as in-depth reporting, fact checking and demands for accuracy.” (ibid, p.66) “The Code promotes: the obligation to verify information before publication (ibid, p.162)

According to Rafizadeh: “A well-written and thought-provoking article can be totally discredited by neglectful fact checking. When a reader comes across an article on a subject matter that they are interested in, that reader expects to receive accurate information. As a journalist, it is important to ensure that the article that is produced is as accurate as it can be. Fact checking is the best way to be confident in the information contained in our article. . . It is a good idea to read through the material a few times, and even to have a friend or colleague read it over as well in case something has been overlooked. . . Once we are armed with your facts, we are ready to investigate the validity of these facts.” (Rafizadeh, 2014)

And according to Wikipedia: “A fact checker is the person who checks factual assertions in non-fictional text, usually intended for publication in a periodical, to determine their veracity and correctness. The job requires general knowledge and the ability to conduct quick and accurate research. The resources and time needed for fact-checking means that this work is not done at most newspapers,

where ***reporters' timely ability to correct and verify their own data and information is chief among their qualifications*** [my emphasis]" (Wikipedia, "Fact Checker")

So, Olmsted writes "I am not a chi square guy. I'm an English major. I am in no position to evaluate the techniques used [and] at least, that is my opinion, based on my own research, experience, and professional training.

As should be obvious from this paper, Olmsted cherry picks articles that confirm his pre-existing rigid ideology. Not only is he "not a chi square guy," that is, that he doesn't understand statistics; but gives NO indication that he understands even the basics of any branch of science, including the ones he so readily writes about with authority, e.g. epidemiology, microbiology, immunology, and the history of infectious diseases. His choice of articles does not reflect any measure of critical thinking, simply confirmation bias. If the article appears to back his beliefs then it is uncritically used. Even as an English major and a career as a journalist, he fails. He based his entire article on a couple of newspaper articles without any indication he read the actual scientific study or, if he did, understood it though it was easily available and he gives no impression that he even read the newspaper articles carefully or, again, if he did, understood them. He simply jumped on a few phrases and off he went with no indication of any fact checking.

In the introduction to this paper, I italicized and bolded what Olmsted wrote in *Age of Autism's* section "About Us": "We are published to give voice to those who ***believe*** [my emphasis] [and] We ***believe*** [my emphasis]."

In the 2014 *Cosmos: A Spacetime Odyssey* follow-up to Carl Sagan's 1980 television series *Cosmos: A Personal Voyage*, astrophysicist Neil deGrasse Tyson, in the final episode 13, "Unafraid of the Dark", discusses how we, human kind, left a world of darkness, and began unraveling the mysteries of the universe. According to Tyson: "a generation of searchers . . . took five simple rules to heart," among these were: "question yourself"; and "don't believe anything just because you want to. ***Believing something doesn't make it so***." [my emphasis] (Tyson, 2014, about minute 37)

As Toumey writes: "Surrounding the plenary authority of science is a great vacuum of understanding about scientific knowledge and reasoning. Studies of science education and literacy reveal that large portions of the American public do not know essential scientific concepts . . . cannot comprehend the methods of scientific reasoning, and could not apply either to public issues." (Toumey, 1996, p.6) "Nevertheless, symbols of science are frequently invoked to support claims . . . which is to say that a semblance of scientific authority can be conjured." (ibid, p.9) Olmsted may like to consider himself "a citizen scientist;" but clearly lacks even a semblance of anything that remotely resembles one. In addition, considering his career as a journalist, he doesn't seem to follow even minimal requirements of ethical journalism that require fact-checking/verifying his information.

Does It Seem Almost Too Simple?

Olmsted writes: "It seems almost too simple, but then, as Mark Blaxill says, epidemics are simple by their very nature, once the cause is identified and the truth is told."

Before discussing whether epidemics are simple by nature or not, a few points on the current complexity of knowledge.

I have a T-shirt with the saying by Thomas Jefferson, "Too Many Books, Too Little Time." Jefferson was a polymath who read history, politics, philosophy, natural sciences, and other subjects.

I sometimes envy Jefferson. I too try to keep up with a variety of subjects. In the past year at local library book sales I acquired a new biography of Einstein, a recent book on the Great Depression, a Pulitzer-Prize winning book on Early American History, and several dozen other books on various topics. Unfortunately, as Jefferson, I only have so much time and I've decided to devote much of it to contributing to one key aspect of Public Health, vaccinations. This includes reading up-to-date books on such subjects as microbiology and immunology. The books I read only a few years ago are already out-of-date. Plus, I read hundreds of articles and papers to prepare for each new article I write.

Knowledge is doubling at ever shorter intervals:

> In his 1982 book Critical Path, futurist and inventor R. Buckminster Fuller estimated that if we took all the knowledge that mankind had accumulated and transmitted by the year One CE as equal to one unit of information, it probably took about 1500 years or until the sixteenth century for that amount of knowledge to double. The next doubling of knowledge from two to four 'knowledge units' took only 250 years, till about 1750 CE. By 1900, one hundred and fifty years later, knowledge had doubled again to 8 units. The speed at which information doubled was getting faster and faster. The doubling speed is now between one and two years.
>
> . . . there was no World Wide Web, no PCs or laptop computers, no DVD, no satellite TV, no mobile phones, no PDA's, no iPods, no digital cameras, no blogs and no Wiki. By March 2010 the world wide web had 20 billion web pages. (Wikia, "Knowledge Doubling")

Just for computers, "Moore's law is the observation that, over the history of computing hardware, the number of transistors in a dense integrated circuit doubles approximately every two years. . . these are improving at roughly exponential rates . . . This exponential improvement has dramatically enhanced the impact of digital electronics in nearly every segment of the world economy." (Wikipedia, "Moore's Law) Though this trend may not continue indefinitely, it has been going on for over 50 years.

As should be clear from the above paper, there is little indication that Olmsted has even attempted to read/master any of the areas of science or history of infectious diseases necessary for developing an informed argument.

And, as Amy Wallace writes:

> In 1905, French mathematician and scientist Henri Poincaré said that the willingness to embrace pseudo-science flourished because people "know how cruel the truth often is, and we wonder whether illusion is not more consoling." [cited in Sagan, 1996, p.368] Decades later, the astronomer Carl Sagan reached a similar conclusion: "Science loses ground to pseudo-science because the latter seems to offer more comfort. A great many of these belief systems address real human needs that are not being met by our society,"

> . . . "There are unsatisfied medical needs, spiritual needs, and needs for communion with the rest of the human community." [Sagan, 1987]
>
> Looking back over human history, rationality has been the anomaly. Being rational takes work, education, and a sober determination to avoid making hasty inferences, even when they appear to make perfect sense. Much like infectious diseases themselves — beaten back by decades of effort to vaccinate the populace — the irrational lingers just below the surface, waiting for us to let down our guard. (Wallace, 2009)

Rothman writes, for instance, in regard to cancer: [that it is a] "naive view that every case of a disease has a single cause. In fact, since diet, smoking, asbestos, and other factors interact with one another and with genetic factors to cause cancer, each case of cancer could be attributed to many separate component causes. (Rothman, 1998, p.13) In his discussion on the induction period, which he defines as "the period of time from causal action until disease initiation . . . he points out that if there is a sequence of causes, "A, B, C, D, and E and we are studying the effect of B, which (let us assume) acts at a narrowly defined point in time, we do not observe the occurrence of disease immediately after B acts. Disease occurs only after the sequence is completed, so there will be a delay while C, D, and finally E act. When E acts, disease occurs. The interval between the action of B and the disease occurrence is the induction time for the effect of B." (ibid p.14)

Susser writes in a section of his book entitled "Abstracting Variables from Ecological Models": "In the ecological model, the interrelationships are appropriately described by terms like "web," "network," or "configuration." Nearly all the interactions between factors in the particular system we have examined are reciprocal and multiple. In this situation, the terms "agent," "host," and "environment," and the associated concepts can be used to describe ecological relationships. . . when the elements of all three components interact, analysis in terms of cause becomes clumsy." (Susser, 1973, p.30) Susser goes on to write: "The criteria of determinants and effects do not correspond with each other, first because determinants have many effects and second because effects have many determinants." (ibid, p.45) And finally: "Where an association is found between two variables, the hypothesis that the association is causal is tested by introducing relevant variables and refining the categories for each variable." (ibid, p.135)

Both Rothman and Susser emphasize that the variable(s) hypothesized in any causal model are both situation specific and tentative. Situation specific in that it is only one factor in a causal chain together with other current factors. Tentative in that one can never be certain of the validity of any causal model. Causal models gain credibility as alternative models are tested and fail.

It would take a monograph or entire book to develop the above points. For those interested, I suggest the following:

> Rothman, Kenneth & Greenland, Sander. (1998) *Modern Epidemiology* Second Edition. Philadelphia, PA: Lippincott Williams & Wilkins.
>
> Susser, Mervyn. (1973) *Causal Thinking in the Health Sciences: Concepts and Strategies in Epidemiology.* New York: Oxford University Press. [this book is out-of-

print; but many university libraries have copies and Amazon Marketplace has a few used copies]

Kaplan, Abraham. (1998) *The Conduct of Inquiry: Methodologies for Behavioral Science.* New Brunswick, NJ: Transaction Publishers.

Obviously, we do focus on specific causes to develop interventions, either for prevention or for treatments; but the point is that they are never as simple as Olmsted or Blaxill would like. And there is NO indication that Olmsted has considered alternative hypotheses/models. How could he when he doesn't give the impression that he has acquired any of the skills, e.g. basic understanding of statistics, epidemiological and other research methods, causal thinking, or the basic concepts and facts of the various fields needed.

J. Barthelow Classen is an MD. However, Olmsted gives no credible defense as to why he relies on Classen's research, which, of course, given his apparent lack of skills and basic knowledge, can only be explained by confirmation bias, that is, Classen says what Olmsted believes. For Olmsted and most other antivaccinationists, the vast majority of researchers around the world are either just wrong or part of some conspiracy to further the interests of the pharmaceutical industry. For Olmsted and others, the few researchers whose writing/findings they agree with are right. They often cite such historical luminaries as Galileo; but, as Shermer writes: "History is replete with tales of the lone scientist working in spite of his peers and flying in the face of the doctrines of his or her own field of study. Most of them turned out to be wrong and we do not remember their names. For every Galileo shown the instruments of torture for advocating a scientific truth, there are a thousand (or even ten thousand) unknowns who's 'truths' never pass muster with other scientists." (Shermer, 1997, p. 50)

The world has become ever more complicated. Simple answers to complex questions provide a refuge, a sense of security, in a world that seems spinning out of control. I make no claim of expertise in all the various disciplines needed to attempt to write about vaccines; however, I have done my darndest to learn the basic concepts and methodologies of the relevant disciplines in addition to having advanced training in behavioral science research methodology, epidemiology, and biostatistics together with extensive reading in the history of infectious diseases. The reference list to just this one paper is quite extensive; but does not include everything I read in preparing this paper and, finally, once written, a draft was e-mailed to numerous persons, some who wished not to be included in the acknowledgments. Olmsted gives NO indication he has done even a minimum of the above. Whereas I am always open to new information, Olmsted appears "certain" he is right.

Summary

1. Dan Olmsted, founder, owner, and chief executive of *Age of Autism,* posted an article, "Weekly Wrap: Measles, Cancer, Autoimmunity, Autism" claiming a recent study, Russell SJ *et al.* (July 2014) "Remission of Disseminated Cancer After Systemic Oncolytic Virotherapy" used a measles vaccine to treat multiple myeloma. Olmsted then goes on to speculate that "wild-type measles . . . performs some unsuspected function in preventing the occurrence of cancer." Olmsted based his entire article on two newspaper accounts of the research with no indication he either read the easily available actual research article and/or understood it. A measles vaccine was not used. Instead it was a genetically engineered measles virus strain that was designed to specifically target

cancer cells. In fact, if Olmsted had even read the two newspaper articles carefully, they both mentioned that the measles virus had been so modified.

2. Though wrong about the use of a measles vaccine, this paper looks at the remainder of Olmsted's paper to show that even if he had been right about the use of a vaccine, he was still wrong about the inferences from it, thus showing his poor scholarship, poor understanding of science, and overall poor knowledge of the history and current status of vaccine-preventable infectious diseases.
3. Olmsted traced "the anonymous Case 3 in the first medical paper on autism, from 1943" [Kanner, "Autistic Disturbances of Affective Contact"][and found] "his death certificate from July 8, 2011, the cause was listed: multiple myeloma." Olmsted then writes: "According to Wikipedia, this kind of cancer is increasing, and affecting younger people." Case 3 was born November 17, 1937, so he was 73½ at the time of his death, certainly not young and well within historical statistics for cancer deaths. Though Wikipedia science articles are well-referenced, this one specifically stated: "Citation needed." This gives just one example of Olmsted's illogic and cherry-picking articles that confirm his pre-existing beliefs, ignoring the "Citation needed."
4. While Olmsted claims measles is a benign childhood disease, both historical and current statistics tell a quite different story. "In the United States in the prevaccine era, approximately 500,000 cases of measles were reported each year, but, in reality, an entire birth cohort of approximately 4 million persons was infected annually. Associated with these cases were an estimated 500 deaths, 150,000 cases with respiratory complications, 100,000 cases of otitis media, 48,000 hospitalizations, 7,000 seizure episodes, and 4,000 cases of encephalitis, which left up to one quarter of patients permanently brain damaged or deaf." (Strebel, 2013, p. 358) Prior to the development of antibiotics, opportunistic bacterial pneumonias killed many more. Measles is just as infectious today, just a plane flight away. Given a much larger population and the increasing risk of deaths from secondary bacterial pneumonias due to increasing rates of antibiotic-resistant microbes, without vaccination the above numbers could be significantly higher.
5. Cancer results from a succession of mutations in normal cells. These mutations occur during cell divisions. Every time a cell divides, approximately six random mutations occur. Most are harmless; but over time, one may not be and then another until cancer develops. Most mutations are random; but environmental factors such as chemicals and microbes can sometimes cause mutations. The more times, the faster the rate of cell divisions, the more chance of mutations. Measles is a system-wide disease that damages and kills cells throughout our bodies. Though initially suppressing our immune systems, the immune response involves an exponential production of immune cells to combat the infection. In other words, the exact opposite of Olmsted's speculation would occur, that is, the risk of mutations would, if anything, accelerate from "wild-type measles." Measles vaccines are attenuated (extremely weakened) to elicit a local short-lived infection, just enough to allow the immune system to recognize it and create memory cells ready to defend against any future exposure.
6. There is a history of microbes and vaccines used to treat cancer and other diseases such as syphilis. For instance, malaria was used to treat syphilis and a tuberculosis vaccine is still used to treat bladder cancer. No one today in their right mind has ever promoted mass infection with malaria to prevent syphilis or mass infection with tuberculosis to prevent bladder cancer.
7. Olmsted writes regarding Case 3 from the first medical article that diagnosed autism: "Leo Kanner, the author of that first autism paper, noted that "following smallpox vaccination at 12 months, he had an attack of diarrhea and fever, from which he recovered in somewhat less than a week." (We can assume he had measles.)" Kanner described the mother as a college graduate

whose father was a physician, that she took copious notes which "indicated obsessive preoccupation with details. . . She watched (and recorded) every gesture and every "look." Measles was ubiquitous at the time with a distinct rash that was well-known to those who were raised during this time period. One could, therefore, question why an educated women, with a propensity towards taking copious notes, would fail to recognize and subsequently document her son's case as suspected measles or, at the very least, document the presence of a measles-like rash along with the fever and diarrhea? It is more likely that the fever and diarrhea either resulted from the smallpox vaccine or from coincident infection by any number of commonly circulating viruses, or even from mild food poisoning. Olmsted's "we can assume he had measles" is nonsensical.

8. Olmsted claims Kanner missed a big clue as Case 3's mother noted his failure to talk: "I can't be sure just when he stopped the imitation of word sounds. It seems that he has gone backward mentally gradually for the last two years." Olmsted assumes this resulted from the smallpox vaccination. However, the mother also, in comparing her two children, explained how Case 3 had shown NO anticipatory response to being picked up as Kanner writes in his discussion: "the children's aloneness from the beginning of life . . . We must, then, assume that these children have come into the world with innate inability to form the usual, biologically provided affective contact with people." So Olmsted missed that Case 3 showed clear signs of autism almost from birth and, though the mother was uncertain when "he stopped the imitation of word sounds," Olmsted decides it must have stemmed from the smallpox vaccination. It appears that it is Olmsted that missed big clues.
9. Olmsted writes: "In short, the first commercial uses of ethyl mercury triggered the first cases of autism; the explosion in vaccines containing it triggered the autism explosion beginning around 1990." Olmsted ignores the fact that Kanner, in the first article describing autism discusses how most of his cases had been previously diagnosed as either retarded or suffering from childhood schizophrenia and had shown signs of "extreme aloneness" from birth. There is a long history of the classification of medical conditions changing with new data and medical knowledge, though the conditions were not new, something Olmsted seems to be unaware of. There is good evidence that autism is not a new condition.
10. Based mainly on one recent article by Classen, "Review of Vaccine Induced Immune Overload and the Resulting Epidemics of Type 1 Diabetes and Metabolic Syndrome, Emphasis on Explaining the Recent Accelerations in the Risk of Prediabetes and other Immune Medicated Diseases" (February 2014), Olmsted discusses how vaccines overload a young child's immune system. Nowhere does he or Classen discuss what is known about the number of antigens our immune system can deal with at any one time in relation to the number a child is exposed to daily from the environment compared to the minute number even when five vaccines are given at once. Classen's article is not a systematic review; but a cherry-picked biased presentation. In addition, he fails to deal with all credible alternative hypotheses and he may have misrepresented one article's findings.
11. Olmsted claims to be a citizen scientist; but his writing gives NO indication he has attempted to learn the basics of epidemiology, biostatistics, microbiology, immunology and other relevant subjects, nor that he has attempted to learn the history and current status of vaccine-preventable diseases. In fact, he writes in another post: "I am not a chi square guy. I'm an English major. I am in no position to evaluate the techniques used to calibrate the autism rate in black males, or anybody else, before or after the MMR shot." In addition, given his profession as journalist, his use of newspaper articles without indication he read the actual research article and his use of

Classen's article because it confirmed his pre-existing beliefs fails the minimal requirements of fact-checking/verification expected of any journalist.

12. Olmsted writes: "It seems almost too simple, but then, as Mark Blaxill says, epidemics are simple by their very nature, once the cause is identified and the truth is told." The rate of knowledge is doubling at ever decreasing time intervals. The world has become very complex. It may be psychologically advantageous in the short run to retreat into a more simplistic world; but Olmsted and *Age of Autism's* use of "belief" falls into one of the caveats for doing science as Neil deGrass Tyson explains in the recent TV series *Cosmos*: "Believing something doesn't make it so." Though we do sometimes find causes of epidemics that lead to interventions, either preventative or for developing treatments, these causes are often situation-specific within a chain of and matrix of events and are often tentative. The science needed to make such determinations is far from simple.

Conclusion

As stated on their website, *Age of Autism*: "We are published to give voice to those who ***believe*** [my emphasis] autism is an environmentally induced illness, that it is treatable, and that children can recover." Dan Olmsted is the founder, owner, and chief editor of *Age of Autism.* My review of his article makes clear that, despite his "belief" that he is a citizen scientist, from his writings he gives NO indication of having learned even the basics of the methods and knowledge base of any of the disciplines necessary to even attempt to evaluate vaccines. In fact, he doesn't even seem to follow the minimal guidelines of good journalism, that is fact-checking/verification; but cherry picks information that confirms his pre-conceived belief system.

Given that *Age of Autism* is one of the antivaccination websites, it contributes to ever decreasing rates of vaccinations as parents under its influence opt not to vaccinate their children. Previous infectious diseases such as whooping cough and measles are on the rise with unnecessary suffering and worse. Assuming as owner and chief editor, Olmsted decides or, at least, has a major input in determining which articles will be posted on *Age of Autism*, his beliefs, his apparent lack of the skills necessary to determine scientific and logical credibility of the information he uses as clearly shown by this paper, should give one pause as to the credibility of anything posted at *Age of Autism.* In fact, reviews I wrote on previous posted papers by Teresa Conrick and Cathy Jameson, both contributing editors to *Age of Autism,* discussed additional examples of poor science, poor scholarship, and a lack of common sense (Harrison, 2015ab).

If parents are to decide on whether to vaccinate their children or not it should be based on solid science and solid scholarship, not the rantings of those based on belief systems displaying cherry picking/confirmation biases lacking any indication of even minimal levels of understanding of scientific methodology, basic scientific knowledge, logic, and common sense. Olmsted was wrong about the use of a measles vaccine in treating multiple myeloma; but had he been right, he would have been wrong about the implications he drew. Literally, Olmsted doesn't know what he is talking about!

Appendix

The Protecton:

A Protecton is defined as the smallest sample of B cells and humoral antibodies that retains all of the functional properties of the whole - the whole being a mouse, a human, or an elephant. For different humoral immune systems to have evolved for every sized species is absurd, and to assume that an infant, which is one-tenth the size of an adult, has an immune system that is fundamentally different from an adult is untenable. Even on intuitive grounds, the notion of a minimum unit of humoral immune function that is repeated according to the size of an individual seems unavoidable. The question then arises as to how we can determine the size of this minimum unit and give it dimensions that are measurable. (Cohn, p.11)

The animal is protected against infection . . . on a per ml, not per individual basis, because there is a minimum concentration of antibody required to eliminate antigen.

Our best estimate is that the Protecton contains 10^7 Ig-expressing B cells and occupies 1 milliliter. As a consequence of the need to establish an effectively high level of haplotype exclusion, only 10% of B cells are inducible or tolerable in that they express functional signaling receptors; the remainder (90%) are non-inducible and non-tolerizable. . . These non-functional B cells are not pure waste as they act as a buffer maintaining the functional cells (which are not engaged by antigen) against displacement by the proliferating cells that are engaged by the steady-state epitopic load. Without this buffer, the animal under an epitopic load permissible in the presence of the buffer could not respond effectively to a new antigenic stimulus.

Although the total number of amino acid sequence variants in complementarity-determining regions of Ig exceeds 10^6, the number of functionally different antibodies expressed per Protecton is only 5×10^4. In spite of this small sample of the total present in each Protecton, the Protectons are equivalently protective. This implies that each Protecton divides the antigenic universe into different sets of epitopes such that the total number of epitopes per set is equal to 5×10^4. Thus, the number of combinations of epitopes taken *EPI* [the average number of epitopes per antigen] at a time (we estimate *EPI* to be of the order of 10) is equal to 10^{40}. For each 10^7 B cells and 1 ml to be equivalently protected . . . each antigen, on average, must express > 300 potential epitopes. The repertoire in each milliliter recognizes, on average, only 10 out of the 300 potential epitopes per antigen.

The Protecton is capable of handling a maximum steady state epitopic load of the order of 5×10^3 without the animal . . . being functionally unresponsive to a new antigen. (Cohen, 1990, pp. 64-66)

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